Box 50-1174

AIR POLLUTION TESTING, INC.
DENVER, SALT LAKE CITY

Source Emissions Testing Report
ETC Canyon Pipeline, LLC

Four (4) TCI Enclosed Flares – NMOC Control Efficiencies
Various Sites
Western Colorado

Test Dates: October 4 – 8, 2010

Report prepared for:
ETC Canyon Pipeline, LLC
1950 Highway 6 & 50
Fruita, Colorado 81521

Report prepared by:
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AIR POLLUTION CONTROL DIVISION
Stack Test Memo

COUNTY NUMBER: **103** SOURCE NUMBER: **0020**

Test Dates: **October 6, 2010**
Report Rec'd: **December 6, 2010**
Memo Date: **February 1, 2011**

COMPANY: **ETC Canyon Pipeline**
SITE LOCATION: **Foundation Creek Gas Plant**

INSPECTOR: **Jeremy Murtaugh**
COUNTY: **Rio Blanco**

CONTACT PERSON: **Sam Duletsky**
TELEPHONE No: **970-858-3425 Ext 80313**

PERMIT No: **95RB0617-1 Mod 4, FA**

SOURCE CLASS: **Major [XX]** Syn Minor [ ] Minor [ ]
Full Compliance Evaluation [ ] Partial Compliance Evaluation [ ] Stack Test [**XX**]
HOURS – INSPECTION: **0.0** TRAVEL & PREP **1.0** REPORT: **2.0** TOTAL: **3.0**

REASON FOR TEST: **Conducted by ETC to address ongoing violations at Foundation Creek.**

Compliance Status: [ ] In Compliance **[XX] Out of Compliance** ******Enforcement Recommended******

On October 6, 2010, stack testing was conducted by Air Pollution Testing (APT) of Arvada Colorado at the ETC Canyon (ETC) Foundation Creek Gas Plant located in Rio Blanco County. Testing was conducted on the TCI flare at the facility to measure mass emission rates and to assess the destruction efficiency of VOC across the device(s). This summary will only discuss testing conducted at the Foundation Creek facility. This test was not observed by Division personnel.

This testing was conducted to assess VOC mass emissions and control efficiency across the flare in order to assess the compliance status of the unit with respect to violations alleged in Compliance Order on Consent (COC) 2009-129/130, signed by ETC on January 25, 2010. This testing was done for the sole purpose of determining the VOC mass emission rates from the device, and to determine the control efficiency of VOCs across the device. Testing for HAPs was not required by the Division, and was not included in the Division approved protocol.

Notwithstanding the issues in Paragraphs H, I, J, and K, this enforcement action is considered resolved with the signing of COC Case # 2009-129/130. ETC signed the COC on Jan 25, 2010, the enforcement case was considered closed on March 25, 2010.

Location	Construction Permit	AIRS ID	TCI Flare Model	Controls Emissions From
Foundation Creek	95RB617-1, Mod 4, FA issued 11/21/08	103-0020-015	1200	TEG still Vent, 1 EG Flash, Miscellaneous Process Vents

This facility is currently classified as a major source for Title V applicability, and is a synthetic minor source for MACT HH applicability.

Test Description:

EPA Reference Methods 1, 2, 3A, 4, 18 and 25A were conducted to determine the volumetric flow and mass emission rate of volatile organic compounds (VOC only) at the TCI flare stack. Method 18 was used for determination and

subsequent subtraction of methane and ethane, which are not classified as VOCs. Three (3) 60- minute runs were performed and the results averaged for the determination of compliance with applicable emission limits. It should be noted that due to the open configuration of the burner and flare stack, the sample ports do not meet Method 1 requirements for upstream/downstream distance to a flow disturbance. To determine uncontrolled emissions to the flare, Methods 1-4, 18 and 25A were used to quantify inlet VOC loading rate. Destruction/removal efficiency (DRE) was determined using measured outlet mass emission rates and inlet loading rates. Test results are shown below:

Foundation Creek
TCI Model 1200

	10/6/2010	3- Run Average	Permitted Limits
Dehy NGL Skid	Gas Throughput Rate (MMscf/day)	Not Given[1]	30 MMscf/d
	TEG Recirculation Rate (gpm)	2.65	6.0 gpm
	Contactor Temp (°F)	17.11	
	Contactor Pressure (psi)	720	
	Gas Throughput Rate (MMscf/day)	Not Given[1]	30 MMscf/d
	EG Ricirculation Rate (gpm)	3.85	8.0 gpm
	Contactor Temp (°F)	90	
	Contactor Pressure (psi)	260	
	Total Inlet Loading (lb/hr)	105.7	
Flare Exhaust Results	FlareOperating Temperature (°F)	1,654	
	Stack Flow (dscfm)	2,380	
	Oxygen (%)	18.4	
	Carbon Dioxide (%)	1.2	
	Moisture (%)	3.4	
	VOC (ppm as propane)	529.3	
	VOC as propane (lb/hr)	**8.65**	
	VOC as propane (tpy)[2]	**37.8**	**2.5**
	DRE (%)	**91.8**	**90%**

1 This information was required to be recorded and reported with the test results in the Division approved test protocol.

2 Calculated by multyplying the lb/hr emission rate by the allowable annual operating hours (8,760)

Conclusions:

Based on test results that show VOC emissions of 37.8 tons per year, ETC has exceeded the annual VOC emission limit of 2.5 tons per year for this point as specified in Condition 4 of the Construction Permit.

Please note that because this testing was conducted while the flare was operating at a temperature in excess of 1,400 °F, this test is not informative of flare emissions or destruction efficiency while operating below 1,400 °F.

Recommendations:

Enforcement action is recommended to address the following ongoing violation:

1) Failure of this flare to comply with the annual VOC mass emission rate of 2.5 tons per year, as specified in Condition 4 of Construction Permit 95RB617-1, Mod 4, FA.

AIR POLLUTION CONTROL DIVISION
Stack Test Memo

COUNTY NUMBER: **045** SOURCE NUMBER: **0667**

Test Dates: **October 7, 2010**
Report Rec'd: **Dec 6, 2010**
Memo Date: **Feb 16, 2011**

COMPANY: **ETC Canyon Pipeline**
SITE LOCATION: **Rifle Bolton**

INSPECTOR: **Jeremy Murtaugh**
COUNTY: **Garfield**

CONTACT PERSON: **Sam Duletsky**
TELEPHONE No: **970-858-3425 Ext 80313**

PERMITs: **07GA1213, FA (TEG Dehy) Issued 9/28/08**
03GA0975, FA Mod 1 (Tank) Issued 9/28/08

SOURCE CLASS: Major [ ] Syn Minor [ ] **Minor [XX]**
Full Compliance Evaluation [ ] Partial Compliance Evaluation [ ] Stack Test [**XX**]
HOURS – INSPECTION: **0.0** TRAVEL & PREP **3.0** REPORT: **4.0** TOTAL: **11.0**

REASON FOR TEST: Subsequent compliance test after failed test on March 23, 2010

Compliance Status: ******Not a Valid Compliance Test, Representative Operation Not Established******

On October 7, 2010, compliance testing was conducted by Air Pollution Testing (APT) at the ETC Canyon (ETC) Rifle Boulton located in Garfield County. Testing was conducted on a TCI flare to measure mass emission rates and to assess the destruction efficiency of VOC across the device(s). This test was not observed by Division personnel.

During a meeting with ETC at the Division's offices on July 16, 2010, ETC agreed to conduct additional testing on selected TCI flares at selected facilities using more costly, but rigorous methods including the use of a calibrated flow meter at the flare inlet in order to more accurately determine inlet mass loading. Despite this agreement, ETC did not use the more rigorous method of using an inline flow meter to determine inlet flow rate to the flare, but instead utilized S-type pitot flow measurements and Method 18 to determine inlet mass loading. This approach is an improvement over past efforts to characterize inlet loading, which used only GlyCalc and Tanks modeling programs to estimate VOC loading to the flare and was approved in the Division approved protocol at ETC's request.

Enforcement Action Case # 2010-074 is currently pending for this facility.

Construction Permit	AIRS ID	TCI Flare Model	Controls Emissions From	Emission Limits
07GA1213, FA	045-0667-005	1200	20.0 MMscf/day TEG dehydrator	**6.83 tpy, 95% DRE**
03GA0975	045-0667-004		One (1) 300 bbl condensate tank	**1.4 tpy, 95% DRE**

The Rifle Boulton facility is classified as a true minor source for Title 5 and PSD applicability, and an area source for MACT HH applicability.

Equipment Operation During Test:

During the test, the plant (and dehy) were processing gas at a rate of 0.27 MMscf/day, with an plant inlet pressure of 792 psi. The dehy contactor was at 790 psi and 64°F; the flash tank at 38 psi and 134 °F. Glycol Re-circulation rate was 1.2 gallon/min

TCI Flare:

Dual 1st stage burners – Unknown
2nd stage burner – Unknown
3rd stage ring burner – Unknown
4th stage – Kimray Valve: Unknown

Supplemental Fuel Use: Unknown

The normal range of these values/settings during normal operation is not known. The manufacturer recommended settings are not known for this equipment either.

TEG Dehy:

The dehy gas processing rate was 0.27 MMscf/day, or approximately 1% of the unit's rated capacity of 20.0 MMscf/day.

Conclusions:

1) Although the test results show compliance with the permitted VOC annual mass emission rate and required destruction efficiency, compliance has not been demonstrated with the dehy operating at within 10% of is rated capacity of 20 MMscf/day

2) Because not operating parameters of the flare were included with the test results, representative operation of the TCI flare was not established during this test.

Recommendations:

Resolution of Enforcement Case # 2010-074 should include the following requirements:

1) Repeat testing to show compliance with applicable permitted VOC annual mass emission limits and required VOC destruction efficiencies while operating at the permitted capacity of the TEG dehy. The equipment must be operating at within 10% of the rated capacity of the equipment, and pertinent operating parameters sufficient to demonstrate equipment operation must be recorded during the test and reported with the test results. A complete description of the flare operation during the test must also be included with the test results.

Test Description:

EPA Reference Methods 1, 2, 3A, 4, 18 and 25A were conducted to determine the volumetric flow and mass emission rate of volatile organic compounds at the TCI flare stack. Method 18 was used for determination and subsequent subtraction of methane. Three (3) 60- minute runs were performed and the results averaged for the determination of compliance with applicable emission limits. It should be noted that due to the open configuration of the burner and flare stack, the sample ports do not meet Method 1 requirements for upstream/downstream distance to a flow disturbance. To determine uncontrolled emissions to the flare (inlet loading), EPA Reference Methods 1-4 and 18 were used. Due to the small diameter of the flare inlet piping (<12 inches), the inlet sampling port does not meet the requirements of Method 2. Test results are summarized in the table below.

Rifle Boulton
TCI Model 1200

10/7/2010	3- Run Average	Permitted Limits
Operating Temperature (°F)	Not Reported	
Stack Flow (dscfm)	2,446	
Oxygen (%)	20.2	
Carbon Dioxide (%)	0.1	
Methane (ppm)	206.9	
VOC (ppm as propane)	39.6	
VOC as propane (lb/hr)	**0.7**	
VOC as propane (tpy)[1]	**3.0**	**8.23[2]**
Dehy Gas Throughput Rate (MMscf/day)	0.27	20 MMscf/d
Glycol Recirculation Rate (gpm)	1.2	
Contactor Temp (°F)	64	
Contactor Pressure (psi)	790	
Flash Tank Temp (°F)	134	
Flash Tank Pressure (psi)	38	
Reboiler Temp (°F)	Not Reported	
Reboiler Pressure (psi)	Not Reported	
Total Inlet Loading (lb/hr)	18.4	
DRE (%)	**96.3**	**95%**

1 Calculated using lb/hr emission rate and annual permitted operating hours (8,760)
2 Emission limits are for dehy and tanks together.

AIR POLLUTION CONTROL DIVISION
Stack Test Memo

COUNTY NUMBER: **077** SOURCE NUMBER: **0288**

Test Dates: **October 4, 2010**
Report Rec'd: **Dec 6, 2010**
Memo Date: **Feb 16, 2011**

COMPANY: **ETC Canyon Pipeline**
SITE LOCATION: **Premier Debeque Gas Plant**

INSPECTOR: **Jeremy Murtaugh**
COUNTY: **Mesa**

CONTACT PERSON: **Sam Duletsky**
TELEPHONE No: **970-858-3425 Ext 80313**

PERMIT No: **97ME0218, Mod 6, IA**

SOURCE CLASS: Major [ ] **Syn Minor [XX]** Minor [ ]
Full Compliance Evaluation [ ] Partial Compliance Evaluation [ ] Stack Test [**XX**]
HOURS – INSPECTION: **0.0** TRAVEL & PREP **1.0** REPORT: **2.0** TOTAL: **3.0**

REASON FOR TEST: **Compliance Test conducted show compliance due to test on 3/24/10 that showed violations**

Compliance Status: ****Representative Operation Not Established, Compliance Not Demonstrated****

On October 4, 2010, compliance testing was conducted by Air Pollution Testing (APT) at the ETC Canyon (ETC) Premier Debeque Gas Plant located in Mesa County, Colorado. Testing was conducted on a TCI flare to measure mass emission rates and to destruction efficiency of VOC across the device(s). This testing was not observed by Division personnel. Testing was previously conducted on this device on March 24, 2010.

During a meeting with ETC at the Division's offices on July 16, 2010, ETC agreed to conduct additional testing on selected TCI flares at selected facilities using more costly, but rigorous methods including the use of a calibrated flow meter at the flare inlet in order to more accurately determine inlet mass loading. Despite this agreement, ETC did not use the more rigorous method of using an inline flow meter to determine inlet flow rate to the flare, but instead utilized S-type pitot flow measurements and Method 18 to determine inlet mass loading. This approach is an improvement over past efforts to characterize inlet loading, which used only GlyCalc and Tanks modeling programs to estimate VOC loading to the flare. This was included in the Division approved protocol at ETC's request.

The source has submitted a permit application for a facility-wide Construction Permit. Permit Number 10ME1379 has been assigned, but has not been issued, pending the resolution of ongoing enforcement action (Case # 2010-076)

Location	Construction Permit	AIRS ID	TCI Flare Model	Controls Emissions From
Premier Debeque	97ME0218, Mod 6, IA issued 11/3/08	077-0288-001	1200	5.0 MMscf/day TEG dehy still vent, 5.0 MMscf/day EG dehy still vent, 300 bbl, 400 bbl condensate tanks (1 of each)

The Premier Debeque facility is classified as a synthetic minor source for Title 5 applicability for CO, VOC, NOx and formaldehyde. The facility is subject to the area source requirements of MACT HH.

Equipment Description:

The Debeque Gas Plant typically processes 2.5-3.0 MMscf/day through the plant, and 600-700 gallons of NGL per day. A TEG dehydrator is in use (no flash tank installed) with regenerator overhead sent to a 30 ft finned-pipe type condenser. EG is also used at the plant for NGL removal. The EG regenerator vents to a 40 foot finned-pipe type condenser, which

together dump to a slop tank. The slop tank serves as a primary liquid dropout after the condensers, with uncondensed gases routed to the flare for destruction.

Equipment Operation During Test:

Flare Operation:

Dual 1st stage burners – Unknown
2nd stage burner – Unknown
3rd stage ring burner – Unknown
4th stage – Kimray Valve – Unknown

Waste Gas Backpressure: Unknown

Supplemental fuel use: Unknown

The normal range of these values/settings during normal operation is not known. The manufacturer recommended settings for this equipment is not known.

TEG, EG Dehy Operation:

No operating parameters of the flare, TEG dehy or EG dehy were included with the test report. Please note that these operating parameters are considered pertinent to emissions of air pollutants from the unit and were required to be recorded and provided with the results, in the Division approved test protocol.

Conclusions:

Although the results of this test show the flare to be in compliance with the permitted annual VOC emission limits (1,984 lb/yr) and with the required VOC destruction efficiency (90%), this test cannot be considered a valid compliance demonstration because representative operation of the equipment was not established during the test.

Recommendations:

Resolution of enforcement case number 2010-076 should include the following requirements:

1) Repeat testing to show compliance with applicable permitted VOC annual mass emission limits and required VOC destruction efficiencies. The equipment must be operating at within 10% of the rated capacity of the equipment, and pertinent operating parameters sufficient to demonstrate equipment operation must be recorded during the test and reported with the test results. A complete description of the flare operation during the test must also be included with the test results.

Test Description:

EPA Reference Methods 1, 2, 3A, 4, 18 and 25A were conducted to determine the volumetric flow and mass emission rate of volatile organic compounds at the TCI flare stack. Method 18 was used for determination and subsequent subtraction of methane. Three (3) 60- minute runs were performed and the results averaged for the determination of compliance with applicable emission limits. It should be noted that due to the open configuration of the burner and flare stack, the sample ports do not meet Method 1 requirements for upstream/downstream distance to a flow disturbance. To determine uncontrolled emissions to the flare (inlet loading), Method 1-4 was used. Please note that due to the small diameter of the inlet piping (<12 inches) the sampling point at the flare inlet did not meet the requirements of Method 2. Destruction/removal efficiency (DRE) was determined using measured outlet mass emission rates and calculated inlet loading rates. Test results are shown below:

Premier Debeque

TCI Model 1200

10/4/2010

	3- Run Average	Emission Limits
Operating Temperature (°F)	Not Reported	
Stack Flow (dscfm)	1,693	
Oxygen (%)	20.2	
Carbon Dioxide (%)	0.3	
Methane (ppm)	66.9	
VOC (ppm as propane)	9.3	
VOC as propane (lb/hr)	**0.11**	
VOC as propane (tpy)[1]	**0.5**	**0.992**
TEG Dehy Gas Throughput (MMscf/day)	Not Reported	
TEG Contactor Temperature (°F)	Not Reported	
TEG Contactor Pressure (psi)	Not Reported	
EG Dehy Gas Throughput (MMscf/day)	Not Reported	
EG Contactor Temperature (°F)	Not Reported	
EG Contactor Pressure (psi)	Not Reported	
Condenser Outlet Temp	Not Reported	
Total Inlet Loading (lb/hr)	17.6	
DRE (%)	**99.4**	**90%**

1 Calculated using lb/hr emission rate and annual permitted operating hours (8,760)

AIR POLLUTION CONTROL DIVISION
Stack Test Memo

COUNTY NUMBER: **103** SOURCE NUMBER: **0004**

Test Dates: **October 8, 2010**
Report Rec'd: **Dec 6, 2010**
Memo Date: **Feb 16, 2011**

COMPANY: **ETC Canyon Pipeline**
SITE LOCATION: **Greasewood Compressor Station**

INSPECTOR: **Jeremy Murtaugh**
COUNTY: **Rio Blanco**

CONTACT PERSON: **Sam Dultesky**
TELEPHONE No: **970-858-3425 Ext 80313**

PERMIT No: **07RB0550, Mod 1, IA (Tanks)**
08RB0594, FA (TEG dehy)

SOURCE CLASS: **Major [XX]** Syn Minor [ ] Minor [ ]
Full Compliance Evaluation [ ] Partial Compliance Evaluation [ ] Stack Test [**XX**]
HOURS – INSPECTION: **0.0** TRAVEL & PREP **0.5** REPORT: **2.0** TOTAL: **2.5**

REASON FOR TEST: **To asses compliance status of a TCI flare after failed test on March 23, 2010**

Compliance Status: ****** Compliance Not Demonstrated at Full Operating Capacity******

On October 8, 2010 compliance testing was conducted by Air Pollution Testing (ATP) at the ETC Canyon (ETC) Greasewood Compressor Station in Rio Blanco County. Testing was conducted on a TCI flare to measure mass emission rates and to assess the destruction efficiency of VOC across the device(s). This testing was not observed by Division personnel.

During a meeting with ETC at the Division's offices on July 16, 2010, ETC agreed to conduct additional testing on selected TCI flares at selected facilities using more costly, but rigorous methods including the use of a calibrated flow meter at the flare inlet in order to more accurately determine inlet mass loading. Despite this agreement, ETC did not use the more rigorous method of using an inline flow meter to determine inlet flow rate to the flare, but instead utilized S-type pitot flow measurements and Method 18 to determine inlet mass loading. This approach is an improvement over past efforts to characterize inlet loading, which used only GlyCalc and Tanks modeling programs to estimate VOC loading to the flare, and was approved in the Division approved protocol at ETC's request.

The source has submitted a permit application for a facility-wide Construction Permit. Permit Number 10RB1664 has been assigned, but has not been issued, pending the resolution of ongoing enforcement action (Case # 2010-073)

The equipment tested is permitted as follows:

Construction Permit	AIRS ID	TCI Flare Model	Controls Emissions From	Emission Limits
07RB0550, Mod 1, IA	103-0004-007	Unknown	One (1) 300 bbl condensate tank	15.0 tons/yr at 3,000 bbl/yr throughput
08RB0594, FA	103-004-004		10.0 MMscf/day TEG dehy still vent	14.2 tons/yr

The Greasewood Compressor Station is classified as a major source for Title 5 applicability with respect to NOx, CO and VOCs.

Equipment Operation During Test:

TCI Flare:

Dual 1st stage burners – Unknown
2nd stage burner – Unknown
3rd stage ring burner – Unknown
4th stage – Kimray Valve: Unknown

Supplemental Fuel Use: Unknown

The normal range of these values/settings during normal operation is not known. The manufacturer recommended settings are not known for this equipment either.

TEG Dehy:

The dehy gas processing rate was 1.8 MMscf/day, or approximately 18% of the unit's rated capacity of 10.0 MMscf/day.

Conclusions:

1) ETC has not demonstrated compliance with the VOC destruction efficiency of 90% required for the condensate tanks
2) Although the test results show VOC emission to be in compliance with the annual mass emission limits for the dehy and tanks together, compliance has not been demonstrated with the dehy operating at within 10% of is rated capacity.

Recommendations:

Resolution of Enforcement Case # 2010-073 should include the following requirements:

1) Repeat testing to show compliance with applicable permitted VOC annual mass emission limits and required VOC destruction efficiencies while operating at the permitted capacity of the TEG dehy. The equipment must be operating at within 10% of the rated capacity of the equipment, and pertinent operating parameters sufficient to demonstrate equipment operation must be recorded during the test and reported with the test results. A complete description of the flare operation during the test must also be included with the test results.

Test Description:

EPA Reference Methods 1, 2, 3A, 4, 18 and 25A were conducted to determine the volumetric flow and mass emission rate of volatile organic compounds at the TCI flare stack. Method 18 was used for determination and subsequent subtraction of methane. Three (3) 60- minute runs were performed and the results averaged for the determination of compliance with applicable emission limits. It should be noted that due to the open configuration of the burner and flare stack, the sample ports do not meet Method 1 requirements for upstream/downstream distance to a flow disturbance. To determine uncontrolled emissions to the flare (inlet loading), EPA Reference Methods 1-4 and 18 were used. Due to the small diameter of the flare inlet piping (<12 inches), the inlet sampling port does not meet the requirements of Method 2. Test results are summarized in the table below.

Greasewood

TCI Flare Model Unknown 10/8/2010	3- Run Average	Permitted Limits
Operating Temperature (°F)	Not Reported	
Stack Flow (dscfm)	1,505	
Oxygen (%)	20.4	
Carbon Dioxide (%)	0.0	
Methane (ppm)	182.6	
VOC (ppm as propane)	16.0	
VOC as propane (lb/hr)	**0.2**	
VOC as propane (tpy)[1]	**0.7**	**29.2[2]**
Dehy Gas Throughput Rate (MMscf/day)	1.8	10 MMscf.d
Contactor Temp (°F)	68	
Contactor Pressure (psi)	710	
Flash Tank Temp (°F)	114	
Flash Tank Pressure (psi)	32	
Reboiler Temp (°F)	375	
Reboiler Pressure (psi)	3.5	
Total Inlet Loading (lb/hr)	0.01	
DRE (%)	**0.0**	**90%**

1 Calculated using lb/hr emission rate and annual permitted operating hours (8,760)
2 Emission limit for dehy and tanks together.

APT

Certification

Team Leader Certification:

I certify that all of the sampling and analytical procedures and data presented in this report are authentic and accurate.

Dane C. Murray

Dane Murray
Field Team Leader, Project Manager

Reviewer Certification:

I certify that all of the testing details and conclusions are accurate and valid.

Matt McGregor
Reviewer, Technical Writer

Table of Contents

1. Introduction

Air Pollution Testing, Inc. (APT) was contracted by ETC Canyon Pipeline, LLC (ETC) for emission testing services at four sites in Western Colorado.

The purpose of the testing program was to determine the mass emission rates of non-methane organic compounds (NMOC) from the exhaust stacks of TCI enclosed flares in service at the various facilities, and the flare NMOC control efficiencies, to determine the compliance status of the units with respect to emission limits imposed by applicable Colorado Department of Public Health and Environment (CDPHE) permits. The flares are all used to control hydrocarbon emissions from glycol dehydrators and condensate tanks.

Personnel involved in the project are shown in Table 1.1 below. The unit identification, permit number, and permitted emission limits are summarized in Table 1.2 on the following page.

ETC Canyon Pipeline, LLC: TCI Flares, Western Colorado Emissions Testing Program Contact Personnel		
Name, Title	*Company, Affiliation Address*	*Phone, FAX*
Mr. Sam Duletsky, Compliance Manager	ETC Canyon Pipeline, LLC 1950 Highway 6&50 Fruita, Colorado 81521	970-858-3425
Mr. Jeremy Murtaugh, Air Pollution Control Specialist	CDPHE, APCD-SS-B1 4300 Cherry Creek Drive South Denver, Colorado 80246	303-692-3130, 303-782-0278
Mr. Brad Ganong, Operations Director	Air Pollution Testing, Inc. 5530 Marshall Street Arvada, Colorado 80002	303-420-5949, ext. 36 303-420-5920

Table 1.1: Emissions Testing Program Contact Personnel

ETC Canyon Pipeline, LLC: TCI Flares, Western Colorado Unit Identification Summary		
Facility	*Permit No.*	*Emissions Limits*
Debeque Compressor Station, Mesa County	97ME0218 – TEG Dehy, TCI Flare	1984 lb/yr VOC
Rifle Boulton Station, Garfield County	03GA0975 – Condensate Tank and TCI Flare	1.4 tpy VOC
	07GA1213 – TEG Dehy and TCI Flare	6.83 tpy VOC
Greasewood Gas Plant, Rio Blanco County	08RB0594 – TEG Dehy 07RB0550 – Storage Tanks	95% VOC control on tanks [1]
Foundation Creek Gas Plant, Rio Blanco County	95RB617-1 – TEG Dehy, NGL Separator, TCI Flare	2.5 tpy VOC
[1] The 95% control requirement for tanks is a state regulation that is believed to apply to all of the units.		

Table 1.2: Source Identification Summary

2. Methods

APT tested in accordance with the following United States Environmental Protection Agency (EPA) source emissions test methods (referenced in *40 CFR Part 60, Appendix A*).

Method 1 – Sample and Velocity Traverses for Stationary Sources

Method 2 – Determination of Stack Gas Velocity and Volumetric Flow Rate

Method 3A – Determination of Oxygen and Carbon Dioxide Concentrations in Emissions from Stationary Sources (Instrumental Analyzer Procedure)

Method 4 – Determination of Moisture Content in Stack Gases

Method 18 – Measurement of Gaseous Organic Compound Emissions by Gas Chromatography

Method 25A – Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer

3. Test Program Summary

APT provided all necessary equipment and labor for the determination of all emission parameters detailed in Table 3.1. All on-site gas analyzers were housed in a mobile, analytical trailer to provide a temperature-controlled environment for stable, accurate

analyzer response.

Triplicate 60-minute test runs were conducted. Flare exhaust NMOC emissions were determined using an on-site analyzer and exhaust flow measurements using a pitot tube. Flare inlet testing consisted of conducting pitot traverses out of a single port, along with collection of integrated Tedlar bag samples for off-site gas chromatography / flame ionization detection analysis to determine the methane and non-methane hydrocarbon content.

Pertinent unit operating and control equipment operating parameters were recorded by ETC personnel and can be found in *Appendix 2*.

ETC Canyon Pipeline, LLC: TCI Flares, Western Colorado Sampling and Analytical Methods			
Gas Parameter	*EPA Method*	*Analytical Method*	*Laboratory*
Enclosed Flare Exhaust Measurements			
gas flow	Methods 1, 2	draft gauge, thermocouple, pitot tube (1)	APT, on-site
O_2, CO_2	Method 3A	paramagnetic and non-dispersive infrared analyzers	
H_2O	Method 4	gravimetric	
NMOC	Method 25A	flame ionization detector with methane separation – Thermo Model 55	
Flare Inlet Stream Measurements			
gas flow	Methods 1, 2	draft gauge, thermocouple, pitot tube (2)	APT, on-site
VOC, NMOC	Method 18	Gas chromatography / flame ionization detector	Empact Analytical, Brighton, CO

(1) The exhaust stacks on TCI flares consist of a series of concentric rings of increasing diameter, open at the base. Historically, compliance testing has been conducted using sample ports installed on one of the higher rings. This location generally does not meet the Method 1 upstream/downstream requirements, which likely results in a small positive bias in the measured emissions.

(2) The inlet locations meet the upstream/downstream flow disturbance requirements of Method 1, but each only have one sample port. Inlet gas stream molecular weight was determined from the Method 18 analysis in lieu of Methods 3 and 4.

Table 3.1: Sampling and Analytical Methods

4. Test Results Summary

The results of the testing are summarized in Tables 4.1 – 4.4 on the following pages. Any emission parameters not found in the tables may be found in *Appendix 1 – Testing Parameters / Sample Calculations*. The following terms are used in the tables:

- %vd – diluent concentration, dry volume percent
- %vw – moisture content, wet volume percent
- dscfm – stack gas flow rate, dry standard (one atmosphere, 68°F) cubic feet per minute
- lb/hr – pollutant mass emission rate, pounds per hour
- lb/year – pollutant mass emission rate, pounds per year
- tons/year – pollutant mass emission rate, tons per year (assumes 8,760 operating hours per year)
- ppmvd – parts per million, dry basis
- NMOC – non-methane organic compounds
- % DRE – destruction removal efficiency
- as C_3H_8 – as propane

ETC Canyon Pipeline, LLC: Debeque Compressor Station **TCI Flare Test Results Summary – October 4, 2010**					
	Run #1	***Run #2***	***Run #3***	**Average**	
Start Time	14:49	16:13	17:31		
Stop Time	15:49	17:13	18:31		
Stack Temp (°F)	432	419	405	**419**	
Stack Flow (dscfm)	1,741	1,597	1,742	**1,693**	**Permit Limits**
O_2 (%vd)	20.5	20.6	19.7	**20.2**	
CO_2 (%vd)	0.2	0.1	0.6	**0.3**	
H_2O (%vw)	2.8	1.3	1.8	**2.0**	
Emission Data					
Outlet NMOC (ppmvd as C_3H_8)	11.3	9.4	7.3	**9.3**	
Outlet NMOC (lb/hr as C_3H_8)	0.1	0.1	0.1	**0.1**	
Outlet NMOC (lb/year as C_3H_8)	1,181	900	762	**947**	***1,984***
Outlet NMOC (tons/year as C_3H_8)	0.6	0.5	0.4	**0.5**	
Inlet NMOC (lb/hr)	22.0	16.1	14.7	**17.6**	
DRE (%)	99.4	99.4	99.4	**99.4**	***≥ 95***

Table 4.1: Test Results Summary, Debeque Flare

ETC Canyon Pipeline, LLC: Foundation Creek Gas Plant TCI Flare Test Results Summary – October 6, 2010					
	Run #1	*Run #2*	*Run #3*	Average	
Start Time	14:11	15:32	17:20		
Stop Time	15:11	16:32	18:20		
Stack Temp (°F)	909	909	912	**910**	**Permit Limits**
Stack Flow (dscfm)	2,511	2,279	2,349	**2,380**	
O_2 (%vd)	18.9	17.4	18.9	**18.4**	
CO_2 (%vd)	0.9	1.5	1.3	**1.2**	
H_2O (%vw)	3.4	4.3	2.7	**3.4**	
Emission Data					
Outlet NMOC (ppmvd as C_3H_8)	525.4	548.7	513.9	**529.3**	
Outlet NMOC (lb/hr as C_3H_8)	9.1	8.6	8.3	**8.6**	
Outlet NMOC (tons/year as C_3H_8)	39.6	37.6	36.3	**37.8**	***2.5***
Inlet NMOC (lb/hr)	112.1	100.2	104.7	**105.7**	
DRE (%)	91.9	91.4	92.1	**91.8**	***≥ 95***

Table 4.2: Test Results Summary, Foundation Creek Flare

ETC Canyon Pipeline, LLC: Rifle Boulton Station TCI Flare Test Results Summary – October 7, 2010					
	Run #1	*Run #2*	*Run #3*	Average	
Start Time	12:17	13:39	14:57		
Stop Time	13:17	14:39	15:57		
Stack Temp (°F)	86	108	109	**101**	**Permit Limits**
Stack Flow (dscfm)	2,602	2,424	2,313	**2,446**	
O_2 (%vd)	20.1	20.2	20.3	**20.2**	
CO_2 (%vd)	0.1	0.1	0.1	**0.1**	
H_2O (%vw)	0.9	0.7	0.8	**0.8**	
Emission Data					
Outlet NMOC (ppmvd as C_3H_8)	50.5	42.8	26.5	**40.0**	
Outlet NMOC (lb/hr as C_3H_8)	0.9	0.7	0.4	**0.7**	
Outlet NMOC (tons/year as C_3H_8)	4.0	3.1	1.8	**3.0**	***1.4, 6.83****
Inlet NMOC (lb/hr)	23.3	14.9	17.1	**18.4**	
DRE (%)	96.1	95.2	97.5	**96.3**	***≥ 95***
***Limit of 1.4 tpy applies to the TCI Flare combined with the condensate storage tanks. The limit of 6.83 tpy applies to the TCI Flare combined with the Triethylene glycol (TEG) natural gas dehydration unit.**					

Table 4.3: Test Results Summary, Rifle Boulton Flare

ETC Canyon Pipeline, LLC: Greasewood Gas Plant TCI Flare Test Results Summary – October 8, 2010					
	Run #1	*Run #2*	*Run #3*	Average	
Start Time	9:21	10:41	11:59		
Stop Time	10:21	11:41	12:59		
Stack Temp (°F)	78	82	88	**82**	
Stack Flow (dscfm)	1,524	1,463	1,528	**1,505**	**Permit Limits**
O_2 (%vd)	20.8	20.2	20.2	**20.4**	
CO_2 (%vd)	0.0	0.0	0.0	**0.0**	
H_2O (%vw)	1.6	0.7	1.2	**1.2**	
Emission Data					
Outlet NMOC (ppmvd as C_3H_8)	12.4	17.0	19.1	**16.2**	
Outlet NMOC (lb/hr as C_3H_8)	0.1	0.2	0.2	**0.2**	
Outlet NMOC (tons/year as C_3H_8)	0.6	0.7	0.9	**0.7**	
Inlet NMOC (lb/hr)	0.01	0.00	0.00	**0.01**	
DRE (%)	0.0	0.0	0.0	**0.0**	**≥ 95**

Table 4.4: Test Results Summary, Greasewood Flare

5. Test Method Details

5.1. Stack Gas Velocity, Volumetric Flow Rate and Moisture

Stack gas velocity, volumetric flow rate and moisture (H_2O) content were measured in accordance with EPA Methods 1, 2 and 4.

Each sampling period consisted of conducting a temperature and differential pressure traverse of the stack using a K-type thermocouple and an S-type pitot tube. Concurrent with the traverse, a sample of gas for moisture determination was extracted from the stack at a constant flow rate of no more than 0.75 cubic feet per minute (cfm). The gas sample passed through a stainless steel probe, through a series of four (4) chilled glass impingers, and through a calibrated dry gas meter. See *Appendix 4 – Schematics* for a diagram of the EPA Methods 1, 2 and 4 sampling train. In lieu of EPA Method 4 Section 8.1.1.1 requirements, a single sample point was used for moisture determination.

Prior to sampling, the first two impingers were each seeded with 100 milliliters of water. The third impinger was empty. The fourth impinger was seeded with 250 grams of dried silica gel. Following sampling, the moisture gain in the impingers was measured gravimetrically to determine the moisture content of the gas.

All of the above data were combined with concurrently collected diluent data to calculate the stack gas velocity and volumetric flow rate in units of feet per second (ft/sec), actual cubic feet per minute (acfm), dry standard (1 atmosphere and 68°F) cubic feet per minute (dscfm), and pounds per hour (lb/hr).

5.1.1. Exceptions to Methods

At the flare inlets, the pitot traverses were conducted from a single port. The molecular weight was determined from the off-site GC analysis.

The flare stacks do not meet the Method 1 upstream/downstream flow disturbance requirements, but have historically been accepted. Installation of a stack extension would be a significant engineering cost and would likely have no impact on the data as the velocity pressures typically encountered on these units are at or near the lower readability limit of a ¼" draft gauge.

5.2. Diluent (O_2 and CO_2) and Non-methane Hydrocarbons

O_2, CO_2 and NMOC emission concentrations were measured in accordance with EPA Methods 3A (O_2 and CO_2) and 25A (NMOC).

Each sampling period consisted of extracting a gas sample from the stack at a constant flow rate of approximately four liters per minute (lpm). The sample passed through a refrigeration-type gas conditioner to remove moisture and into the sampling port of a Servomex Series 1400 paramagnetic O_2 / non-dispersive infrared CO_2 analyzer and a Thermo Model 55 flame ionization analyzer equipped with a methane separator. The gas conditioner was bypassed for the NMOC analyzer.

The gas concentrations were displayed on the analyzer front panels in units of either parts per million, wet volume basis as propane (ppmvw as C_3H_8 – NMOC) or percent, dry volume basis (%vd – O_2 and CO_2) and logged to a computerized data acquisition system (CDAS). Please see *Appendix 4 – Schematics* for a diagram of the EPA Methods 3A and 25A sampling train.

Before and after each sampling period, the analyzers were challenged with EPA Protocol 1 calibration gases to calibrate the instrument, to verify linearity of response, and to quantify zero and span drift for the previous sampling period. To ensure no system bias, the analyzer calibrations were conducted by introducing all gases to the analyzer at the sampling probe at stack pressure. Following sampling, the CDAS data were averaged in one-minute increments, corrected for instrumental drift, and reported as average emission concentrations for each sampling period.

Sampling (diluent and NMOC) was conducted at the approximate area center of the stacks in accordance with EPA Method 25A requirements.

The above data were combined with concurrently collected flow data to calculate NMOC emissions and concentrations in units of pounds per hour (lb/hr), pounds per year (lb/year) and tons per year (tons/year).

5.3. Total Hydrocarbon / NMOC – Flare Inlets

Methane and NMOC concentrations were measured in accordance with EPA Method 18. Triplicate samples were collected from each inlet in Tedlar bags for off-site GCFID analysis for C1 – C6 hydrocarbons, oxygen, carbon dioxide and nitrogen.

The sample spiking procedures from Method 18 were not proposed as the samples (essentially fuel gas samples) were expected to be stable. Any analyte loss would be a bias against the source.

The Method 18 concentration data were combined with the pitot traverse data to calculate flare inlet NMOC mass flow to determine the control efficiency for NMOC.

6. Conclusions

The results of the testing conducted by APT demonstrate that the TCI Flares at Debeque Compressor Station and Rifle Boulton Station are operating in compliance with applicable emission limits. The test results for Greasewood Gas Plant indicate that no VOC destruction is occurring. This is not the case because the flare appears to be operating well. Thus, the results suggest that there is some unidentified factor that makes this particular flare difficult to test, such as possible difficulty with measuring the inlet loading to the flare. The TCI Flare at Foundation Creek Gas Plant exceeds all its applicable emission limits.

Appendix 1

Testing Parameters / Sample Calculations

Debeque Compressor Station Flare

ETC Canyon Pipeline, LLC
Debeque Compressor Station
Mesa County, CO
Flare Inlet
10/04/10

Field Reference Method Data					
	Run #	1	2	3	Average
	Start Time	14:49	16:13	17:31	
	Stop Time	15:49	17:13	18:31	
	Sample Duration (minutes)	60	60	60	
D_S	Stack Diameter (inches)	4.0	4.0	4.0	4.0
$\sqrt{\Delta P_{AVG}}$	Average (Delta P)^{½} (" H_2O)^{½}	0.073	0.064	0.067	0.068
C_P	Pitot Tube Constant (unitless)	0.82	0.82	0.82	0.82
T_S	Stack Temperature (°F)	96	94	93	94
P_{bar}	Barometric Pressure (mbar)	847	847	847	847
P_{bar}	Barometric Pressure (" Hg)	25.01	25.01	25.01	25.01
Ps	Stack Pressure (" H_2O)	0.0	0.0	0.0	0.0
O_2%vd	O_2 (%vd)	0.4	0.6	0.4	0.5
CO_2%vd	CO_2 (%vd)	3.9	4.1	4.0	4.0
N_2%vd	N_2 (%vd)	95.7	95.3	95.5	95.5

Laboratory Data					
MW	Run #	1	2	3	Average
30.07	C2 mole %	3.70	3.36	3.48	3.51
44.09	C3 mole %	1.76	1.45	1.50	1.57
58.12	C4 mole %	1.19	1.04	1.02	1.08
72.16	C5 mole %	0.98	0.75	0.8	0.84
86.19	C6 mole %	5.42	4.43	3.36	4.40

Reference Method Calculations					
	Run #	1	2	3	Average
B_{ws}	Saturated Moisture Content (%/100)	0.068	0.064	0.062	0.065
M_D	Molecular Weight Dry (lb/lb-mole)	28.64	28.68	28.66	28.66
M_A	Molecular Weight Wet (lb/lb-mole)	27.92	27.99	28.00	27.97
V_S	Gas Velocity (ft/sec)	4.6	4.0	4.2	4.2
F_{ACFM}	Gas Flow (acfm)	23.9	20.9	21.9	22.2
F_{DSCFM}	Gas Flow (dscfm)	17.7	15.6	16.4	16.6
lb/hr	Gas Flow (lb/hr)	83	73	76	77
lb/hr	NMOC (lb/hr)	22.0	16.1	14.7	17.6

DRE Calculations					
	Run #	1	2	3	Average
lb/hr	Outlet NMOC (lb/hr as C_3H_8)	0.13	0.10	0.09	0.11
lb/hr	Inlet NMOC (lb/hr)	22.0	16.1	14.7	17.6
DRE (%)	VOC DRE (%)	99.4%	99.4%	99.4%	99.4%

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Debeque Compressor Station
Mesa County, CO
Flare Outlet
10/4/2010

Field Reference Method Data					
	Run #	1	2	3	Average
	Start Time	14:49	16:13	17:31	
	Stop Time	15:49	17:13	18:31	
	Sample Duration (minutes)	60	60	60	
hrs	Hours of Operation / Year	8,760	8,760	8,760	8,760
D_S	Stack Diameter (inches)	36.5	36.5	36.5	36.5
$\sqrt{\Delta P_{AVG}}$	Average (Delta P)^{½} (" H_2O)^{½}	0.1060	0.0953	0.1036	0.1016
C_P	Pitot Tube Constant (unitless)	0.82	0.82	0.82	0.82
T_S	Stack Temperature (°F)	432	419	405	419
P_{bar}	Barometric Pressure (mbar)	847	847	847	847
P_{bar}	Barometric Pressure (" Hg)	25.01	25.01	25.01	25.01
Ps	Stack Pressure (" H_2O)	0.0	0.0	0.0	0.0
Y_d	Meter Y Factor (unitless)	0.980	0.980	0.980	0.980
T_m	Meter Temperature (°F)	81	78	81	80
V_m	Sample Volume (ft^3)	40.953	41.347	41.397	41.232
ΔH	Orifice Pressure Delta H (" H_2O)	1.0	1.0	1.0	1.0
V_{lc}	Moisture (g)	20.2	9.4	13.1	14.2
O_2%vd	O_2 (%vd)	20.5	20.6	19.7	20.2
CO_2%vd	CO_2 (%vd)	0.2	0.1	0.6	0.3
N_2%vd	N_2 (%vd)	79.4	79.3	79.7	79.5
wet	CH_4 (ppmvw)	74.5	62.1	64.2	66.9
wet	NMOC (ppmvw as C_3H_8)	11.0	9.3	7.1	9.1

Reference Method Calculations					
	Run #	1	2	3	Average
V_{mstd}	Sample Volume (dscf)	32.799	33.328	33.176	33.101
V_{wstd}	Moisture Volume (scf)	0.95	0.44	0.62	0.67
B_{ws}	Moisture Content (%/100)	0.028	0.013	0.018	0.020
M_D	Molecular Weight Dry (lb/lb-mole)	28.84	28.84	28.88	28.86
M_A	Molecular Weight Wet (lb/lb-mole)	28.54	28.70	28.68	28.64
V_S	Gas Velocity (ft/sec)	8.3	7.4	8.0	7.9
F_{ACFM}	Gas Flow (acfm)	3,622	3,223	3,477	3,441
F_{DSCFM}	Gas Flow (dscfm)	1,741	1,597	1,742	1,693
lb/hr	Gas Flow (lb/hr)	7,964	7,233	7,924	7,707
dry	CH_4 (ppmvd)	76.7	61.3	63.0	67.0
lb/hr	CH_4 (lb/hr)	0.3	0.2	0.3	0.3
tpy	CH_4 (tons/year)	1.5	1.1	1.2	1.2
dry	NMOC (ppmvd as C_3H_8)	11.3	9.4	7.3	9.3
lb/hr	NMOC (lb/hr as C_3H_8)	0.1	0.1	0.1	0.1
lb/year	NMOC (lb/year as C_3H_8)	1,181	900	762	947
tpy	NMOC (tons/year as C_3H_8)	0.6	0.5	0.4	0.5

ETC Canyon Pipeline, LLC
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Mesa County, CO
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Linearity Information				
Gas	O_2	CO_2	CH_4	NMOC
Span Gas Value/Range	21.1	19.7	1500.0	84.5
Bias Gas Value	10.00	10.10	310.0	30.0
Bias Check (Zero)	0.0	0.0	0.5	-0.4
Bias Check (Span)	10.1	10.1	310.0	31.2
Linearity Bias (Zero)	0.0	0.0	0.0	0.0
Linearity Bias (Span)	10.1	10.1	311.4	30.2
Gas Concentration	%	%	(ppm)	(ppm)
1	0.0	0.0	0.0	0.0
2	10.0	10.1	310	30.0
3	21.1	19.7	759	50.1
4			1500	84.5
Response				
1	0.0	0.0	0.0	0.0
2	10.1	10.1	311.4	30.2
3	21.1	19.7	766.5	50.9
4			1500.6	84.9
Difference				
1	0.0	0.0	0.0	0.0
2	0.1	0.0	1.4	0.2
3	0.0	0.0	7.5	0.8
4	0.0	0.0	0.6	0.4
Results				
Zero Bias	0.00%	0.00%	0.03%	0.47%
Span Bias	0.00%	0.00%	0.09%	1.18%
Max Calibration Error	0.47%	0.00%	0.50%	0.95%

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Debeque Compressor Station
Mesa County, CO
Flare Outlet
10/04/10

Run 1

Start Time	10/4/10 14:49
Run Length	60
Stop Time	15:49

Calibration Information				
Gas	O_2	CO_2	CH_4	NMOC
Instrument Range	21.1	19.7	1500	85
Span Gas Value	10.00	10.10	310.0	30.0
Calibration				
Pretest Calibration				
Zero%	0.0	0.0	0.5	-0.4
Span%	10.1	10.1	310.0	31.2
Post Test Calibration				
Zero%	0.0	0.0	1.1	1.0
Span%	10.0	10.1	337.2	32.1
Results				
Absolute Bias (Zero)	0.0%	0.0%	0.1%	1.2%
Absolute Bias (Span)	0.5%	0.0%	1.7%	2.2%
Absolute Drift (Zero)	0.0%	0.0%	0.0%	1.7%
Absolute Drift (Span)	0.5%	0.0%	1.8%	1.1%

	Corrected O_2 %	Corrected CO_2 %	Corrected CH_4 ppmvw	Corrected NMOC ppm
	20.5	*0.2*	*74.5*	*11.0*
Run Length (Minutes) / Time	Uncorrected O_2 %	Uncorrected CO_2 %	Uncorrected CH_4 ppmvw	Uncorrected NMOC ppm
	20.6	0.2	78.4	11.8
1 14:49	20.5	0.2	97.3	5.6
2 14:50	20.5	0.2	92.3	0.7
3 14:51	20.6	0.1	77.1	7.8
4 14:52	20.5	0.2	200.6	14.1
5 14:53	20.6	0.1	214.1	14.6
6 14:54	20.6	0.1	102.0	10.4
7 14:55	20.6	0.1	137.1	6.5
8 14:56	20.7	0.1	25.6	5.5
9 14:57	20.6	0.1	25.1	6.0
10 14:58	20.7	0.1	35.9	6.1
11 14:59	20.7	0.0	101.9	5.5
12 15:00	20.7	0.1	26.3	1.9
13 15:01	20.7	0.0	38.3	5.7
14 15:02	20.7	0.1	11.8	9.1
15 15:03	20.7	0.1	24.6	4.1
16 15:04	20.7	0.1	16.3	6.4
17 15:05	20.7	0.1	16.4	8.5
18 15:06	20.7	0.1	50.4	3.1
19 15:07	20.6	0.1	37.6	4.7
20 15:08	20.7	0.1	18.7	8.7
21 15:09	20.7	0.0	27.7	5.7
22 15:10	20.7	0.1	21.7	6.3
23 15:11	20.7	0.1	25.9	8.4
24 15:12	20.6	0.1	29.4	7.3
25 15:13	20.7	0.1	20.9	4.7
26 15:14	20.4	0.2	18.1	6.0
27 15:15	20.7	0.1	13.7	8.2
28 15:16	20.7	0.0	4.7	8.8
29 15:17	20.5	0.2	5.8	10.2
30 15:18	20.7	0.1	14.7	7.7
31 15:19	20.7	0.0	47.6	2.5
32 15:20	20.7	0.1	4.5	10.3
33 15:21	20.7	0.1	9.9	2.4
34 15:22	20.7	0.1	18.4	4.5
35 15:23	20.4	0.2	37.0	5.6
36 15:24	20.6	0.2	55.2	12.2
37 15:25	20.6	0.2	205.6	41.9
38 15:26	20.7	0.1	70.8	13.8
39 15:27	20.6	0.1	89.4	10.5
40 15:28	20.5	0.3	76.1	9.6
41 15:29	20.5	0.2	105.9	20.7
42 15:30	20.5	0.2	161.6	24.2
43 15:31	20.3	0.3	202.1	26.0
44 15:32	20.5	0.3	178.3	29.6
45 15:33	20.5	0.2	157.3	32.6
46 15:34	20.3	0.3	192.4	29.3
47 15:35	20.6	0.2	218.6	22.8
48 15:36	20.3	0.3	170.3	18.2
49 15:37	20.4	0.3	104.5	15.0
50 15:38	20.4	0.2	115.7	22.6
51 15:39	20.6	0.1	118.7	15.6
52 15:40	20.5	0.2	163.8	3.3
53 15:41	20.6	0.1	104.6	19.6
54 15:42	20.2	0.4	50.9	7.9
55 15:43	20.4	0.3	70.7	8.9
56 15:44	20.3	0.4	60.8	9.8
57 15:45	20.1	0.5	95.2	12.2
58 15:46	20.4	0.3	150.2	38.7
59 15:47	20.6	0.1	92.2	21.5
60 15:48	20.5	0.2	43.7	5.8

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Debeque Compressor Station
Mesa County, CO
Flare Outlet
10/04/10

Run 2

Start Time	10/4/10 16:13
Run Length	60
Stop Time	17:13

Calibration Information				
Gas	O_2	CO_2	CH_4	NMOC
Instrument Range	21.1	19.7	1500	85
Span Gas Value	10.00	10.10	310.0	30.0
Calibration				
Pretest Calibration				
Zero%	0.0	0.0	1.1	1.0
Span%	10.0	10.1	337.2	32.1
Post Test Calibration				
Zero%	0.0	0.0	1.4	0.0
Span%	10.0	10.1	335.2	30.5
Results				
Absolute Bias (Zero)	0.0%	0.0%	0.1%	0.0%
Absolute Bias (Span)	0.5%	0.0%	1.6%	0.4%
Absolute Drift (Zero)	0.0%	0.0%	0.0%	1.2%
Absolute Drift (Span)	0.0%	0.0%	0.1%	1.9%
	Corrected O_2 %	Corrected CO_2 %	Corrected CH_4 ppmvw	Corrected NMOC ppm
	20.6	*0.1*	*62.1*	*9.3*

Run Length (Minutes)	Time	Uncorrected O_2 %	Uncorrected CO_2 %	Uncorrected CH_4 ppmvw	Uncorrected NMOC ppm
		20.6	0.1	68.3	10.0
1	16:13	20.1	0.4	113.3	10.8
2	16:14	20.2	0.4	83.8	7.3
3	16:15	20.3	0.3	130.6	18.5
4	16:16	20.5	0.2	140.6	22.8
5	16:17	20.3	0.3	110.4	15.6
6	16:18	20.3	0.4	126.1	16.1
7	16:19	20.7	0.1	123.7	20.4
8	16:20	20.7	0.1	148.7	25.6
9	16:21	20.7	0.1	11.9	2.8
10	16:22	20.6	0.1	15.9	2.6
11	16:23	20.6	0.1	18.2	1.0
12	16:24	20.6	0.1	51.3	11.8
13	16:25	20.6	0.1	69.0	12.9
14	16:26	20.6	0.1	46.1	8.4
15	16:27	20.6	0.1	48.2	7.9
16	16:28	20.5	0.1	75.6	13.9
17	16:29	20.5	0.2	35.4	4.4
18	16:30	20.6	0.1	91.9	17.0
19	16:31	20.6	0.1	57.7	12.3
20	16:32	20.6	0.2	31.2	5.3
21	16:33	20.5	0.2	29.1	3.6
22	16:34	20.5	0.2	81.1	16.5
23	16:35	20.5	0.1	112.6	21.4
24	16:36	20.5	0.2	86.7	13.2
25	16:37	20.5	0.1	49.5	4.0
26	16:38	20.6	0.1	71.5	4.8
27	16:39	20.6	0.1	105.4	15.2
28	16:40	20.6	0.1	71.1	15.1
29	16:41	20.5	0.1	57.9	7.1
30	16:42	20.6	0.1	39.2	5.7
31	16:43	20.6	0.1	47.9	8.1
32	16:44	20.5	0.1	97.7	15.4
33	16:45	20.6	0.1	72.6	10.1
34	16:46	20.5	0.1	33.2	1.2
35	16:47	20.7	0.1	47.6	5.0
36	16:48	20.6	0.1	86.9	15.2
37	16:49	20.6	0.1	60.8	9.0
38	16:50	20.6	0.1	29.9	3.2
39	16:51	20.7	0.1	60.9	6.5
40	16:52	20.7	0.1	93.3	12.8
41	16:53	20.6	0.1	67.4	9.0
42	16:54	20.6	0.1	32.1	2.3
43	16:55	20.7	0.1	20.1	2.2
44	16:56	20.6	0.1	40.8	5.7
45	16:57	20.6	0.1	54.7	7.3
46	16:58	20.6	0.1	52.3	7.1
47	16:59	20.6	0.1	42.9	4.1
48	17:00	20.6	0.1	45.2	3.6
49	17:01	20.6	0.1	92.4	11.5
50	17:02	20.6	0.1	114.8	18.1
51	17:03	20.6	0.1	59.8	6.6
52	17:04	20.6	0.1	36.2	3.6
53	17:05	20.6	0.1	92.2	17.3
54	17:06	20.6	0.1	107.7	19.0
55	17:07	20.6	0.1	73.0	14.0
56	17:08	20.6	0.1	26.8	0.2
57	17:09	20.6	0.1	22.5	3.8
58	17:10	20.5	0.2	78.5	11.8
59	17:11	20.6	0.1	93.3	15.0
60	17:12	20.6	0.1	83.4	7.7

ETC Canyon Pipeline, LLC
Debeque Compressor Station
Mesa County, CO
Flare Outlet
10/04/10

Run 3

Start Time	10/4/10 17:31
Run Length	60
Stop Time	18:31

Calibration Information				
Gas	O_2	CO_2	CH_4	NMOC
Instrument Range	21.1	19.7	1500	85
Span Gas Value	10.00	10.10	310.0	30.0
Calibration				
Pretest Calibration				
Zero%	0.0	0.0	1.4	0.0
Span%	10.0	10.1	335.2	30.5
Post Test Calibration				
Zero%	0.0	0.0	2.0	0.9
Span%	10.0	10.1	329.2	30.4
Results				
Absolute Bias (Zero)	0.0%	0.0%	0.1%	1.1%
Absolute Bias (Span)	0.5%	0.0%	1.2%	0.2%
Absolute Drift (Zero)	0.0%	0.0%	0.0%	1.1%
Absolute Drift (Span)	0.0%	0.0%	0.4%	0.1%

		Corrected O_2 %	Corrected CO_2 %	Corrected CH_4 ppmvw	Corrected NMOC ppm
		19.7	*0.6*	*64.2*	*7.1*
Run Length (Minutes)	Time	Uncorrected O_2 %	Uncorrected CO_2 %	Uncorrected CH_4 ppmvw	Uncorrected NMOC ppm
		19.7	0.6	70.2	7.6
1	17:31	20.5	0.1	18.9	1.2
2	17:32	20.6	0.1	10.5	0.2
3	17:33	20.6	0.1	64.4	7.6
4	17:34	20.6	0.1	42.9	2.6
5	17:35	20.6	0.0	19.3	0.4
6	17:36	20.6	0.0	33.2	2.3
7	17:37	20.6	0.0	21.2	1.2
8	17:38	20.6	0.0	35.8	4.5
9	17:39	20.3	0.3	30.9	5.0
10	17:40	20.0	0.4	2.8	0.3
11	17:41	20.3	0.2	5.6	-0.1
12	17:42	20.2	0.3	7.3	-0.4
13	17:43	19.9	0.5	7.1	0.0
14	17:44	19.6	0.7	7.0	0.0
15	17:45	19.2	0.9	18.2	2.5
16	17:46	19.8	0.5	90.6	16.4
17	17:47	20.5	0.1	230.1	42.2
18	17:48	19.8	0.6	85.0	14.9
19	17:49	20.5	0.2	5.9	-0.2
20	17:50	20.2	0.3	40.5	-0.1
21	17:51	20.1	0.4	47.1	1.7
22	17:52	19.9	0.5	91.1	16.2
23	17:53	20.1	0.4	65.7	1.7
24	17:54	20.4	0.2	30.7	2.8
25	17:55	19.8	0.6	55.3	8.5
26	17:56	20.1	0.4	77.6	11.4
27	17:57	20.0	0.4	70.1	3.7
28	17:58	20.0	0.5	56.3	4.9
29	17:59	19.3	0.8	75.3	14.4
30	18:00	19.9	0.5	117.0	19.8
31	18:01	19.1	0.9	124.4	15.9
32	18:02	19.4	0.8	74.2	5.7
33	18:03	19.9	0.5	94.8	11.5
34	18:04	19.8	0.5	188.2	27.6
35	18:05	19.3	0.8	135.6	17.3
36	18:06	19.3	0.8	92.5	2.6
37	18:07	19.4	0.8	155.1	11.2
38	18:08	19.2	0.8	93.0	11.5
39	18:09	19.5	0.7	55.5	7.1
40	18:10	19.7	0.6	96.1	8.9
41	18:11	19.4	0.8	113.1	4.8
42	18:12	19.4	0.8	126.5	19.1
43	18:13	19.4	0.8	109.5	19.2
44	18:14	19.2	0.9	56.6	2.6
45	18:15	19.1	0.9	40.9	-0.2
46	18:16	19.2	0.9	81.0	11.5
47	18:17	18.7	1.1	81.5	12.1
48	18:18	18.6	1.2	87.9	9.1
49	18:19	18.9	1.0	147.7	11.7
50	18:20	19.0	1.0	128.9	11.4
51	18:21	19.3	0.8	138.4	18.8
52	18:22	19.4	0.8	104.2	13.3
53	18:23	19.4	0.7	39.2	1.0
54	18:24	19.2	0.9	47.4	0.6
55	18:25	19.5	0.8	49.3	3.4
56	18:26	19.5	0.7	74.8	6.8
57	18:27	19.4	0.8	59.0	0.6
58	18:28	19.5	0.7	30.2	1.1
59	18:29	19.6	0.7	67.6	3.7
60	18:30	19.5	0.7	53.5	0.1

Foundation Creek Gas Plant Flare

ETC Canyon Pipeline, LLC
Foundation Creek Gas Plant
Rio Blanco County, CO
Flare Inlet
10/06/10

Field Reference Method Data					
	Run #	1	2	3	Average
	Start Time	14:11	15:32	17:20	
	Stop Time	15:11	16:32	18:20	
	Sample Duration (minutes)	60	60	60	
D_S	Stack Diameter (inches)	4.0	4.0	4.0	4.0
$\sqrt{\Delta P_{AVG}}$	Average (Delta P)^{½} (" H_2O)^{½}	0.148	0.151	0.141	0.147
C_P	Pitot Tube Constant (unitless)	0.82	0.82	0.82	0.82
T_S	Stack Temperature (°F)	68	62	53	61
P_{bar}	Barometric Pressure (mbar)	794	794	794	794
P_{bar}	Barometric Pressure (" Hg)	23.45	23.45	23.45	23.45
Ps	Stack Pressure (" H_2O)	8.0	9.0	8.5	8.5
O_2%vd	O_2 (%vd)	0.0	0.0	0.0	0.0
CO_2%vd	CO_2 (%vd)	2.6	2.1	2.2	2.3
N_2%vd	N_2 (%vd)	97.4	97.9	97.8	97.7

Laboratory Data					
MW	Run #	1	2	3	Average
30.07	C2 mole %	6.68	6.62	6.39	6.56
44.09	C3 mole %	6.52	6.33	6.15	6.33
58.12	C4 mole %	6.93	6.72	6.63	6.76
72.16	C5 mole %	5.25	5.07	5.24	5.19
86.19	C6 mole %	7.52	4.93	7.06	6.50

Reference Method Calculations					
	Run #	1	2	3	Average
B_{ws}	Saturated Moisture Content (%/100)	0.029	0.023	0.017	0.023
M_D	Molecular Weight Dry (lb/lb-mole)	28.41	28.34	28.35	28.37
M_A	Molecular Weight Wet (lb/lb-mole)	28.11	28.10	28.18	28.13
V_S	Gas Velocity (ft/sec)	9.2	9.3	8.6	9.0
F_{ACFM}	Gas Flow (acfm)	48.1	48.7	45.0	47.3
F_{DSCFM}	Gas Flow (dscfm)	37.5	38.8	36.6	37.6
lb/hr	Gas Flow (lb/hr)	169	174	164	169
lb/hr	NMOC (lb/hr)	112.1	100.2	104.7	105.7

DRE Calculations					
	Run #	1	2	3	Average
lb/hr	Outlet NMOC (lb/hr as C_3H_8)	9.1	8.6	8.3	8.6
lb/hr	Inlet NMOC (lb/hr)	112.1	100.2	104.7	105.7
DRE (%)	VOC DRE (%)	91.9%	91.4%	92.1%	91.8%

37.6 × 60 = 2256

240.00

225,000 / 2

ETC Canyon Pipeline, LLC
Foundation Creek Gas Plant
Rio Blanco County, CO
Flare Outlet
10/6/2010

Field Reference Method Data					
	Run #	1	2	3	Average
	Start Time	14:11	15:32	17:20	
	Stop Time	15:11	16:32	18:20	
	Sample Duration (minutes)	60	60	60	
hrs	Hours of Operation / Year	8,760	8,760	8,760	8,760
D_S	Stack Diameter (inches)	36.5	36.5	36.5	36.5
$\sqrt{\Delta P_{AVG}}$	Average (Delta P)^{½} (" H_2O)^{½}	0.1967	0.1800	0.1833	0.1867
C_P	Pitot Tube Constant (unitless)	0.82	0.82	0.82	0.82
T_S	Stack Temperature (°F)	909	909	912	910
P_{bar}	Barometric Pressure (mbar)	794	794	794	794
P_{bar}	Barometric Pressure (" Hg)	23.45	23.45	23.45	23.45
Ps	Stack Pressure (" H_2O)	-0.02	-0.02	-0.02	-0.02
Y_d	Meter Y Factor (unitless)	0.980	0.980	0.980	0.980
T_m	Meter Temperature (°F)	75	81	59	72
V_m	Sample Volume (ft^3)	44.285	42.339	41.973	42.866
ΔH	Orifice Pressure Delta H (" H_2O)	1.0	1.0	1.0	1.0
V_{lc}	Moisture (g)	24.8	30.2	19.3	24.8
O_2%vd	O_2 (%vd)	18.9	17.4	18.9	18.4
CO_2%vd	CO_2 (%vd)	0.9	1.5	1.3	1.2
N_2%vd	N_2 (%vd)	80.2	81.1	79.9	80.4
wet	CH_4 (ppmvw)	759.6	800.7	745.4	768.6
wet	NMOC (ppmvw as C_3H_8)	507.7	525.2	500.1	511.0

Reference Method Calculations					
	Run #	1	2	3	Average
V_{mstd}	Sample Volume (dscf)	33.638	31.836	32.889	32.788
V_{wstd}	Moisture Volume (scf)	1.17	1.42	0.91	1.17
B_{ws}	Moisture Content (%/100)	0.034	0.043	0.027	0.034
M_D	Molecular Weight Dry (lb/lb-mole)	28.90	28.94	28.96	28.93
M_A	Molecular Weight Wet (lb/lb-mole)	28.53	28.47	28.67	28.56
V_S	Gas Velocity (ft/sec)	19.7	18.1	18.4	18.7
F_{ACFM}	Gas Flow (acfm)	8,601	7,878	8,004	8,161
F_{DSCFM}	Gas Flow (dscfm)	2,511	2,279	2,349	2,380
lb/hr	Gas Flow (lb/hr)	11,547	10,556	10,775	10,960
dry	CH_4 (ppmvd)	786.0	766.5	725.4	759.3
lb/hr	CH_4 (lb/hr)	4.9	4.4	4.3	4.5
tpy	CH_4 (tons/year)	21.6	19.1	18.6	19.8
dry	NMOC (ppmvd as C_3H_8)	525.4	548.7	513.9	529.3
lb/hr	NMOC (lb/hr as C_3H_8)	9.1	8.6	8.3	8.6
tpy	NMOC (tons/year as C_3H_8)	39.6	37.6	36.3	37.8

ETC Canyon Pipeline, LLC
Foundation Creek Gas Plant
Rio Blanco County, CO
Flare Outlet
10/06/10

Linearity Information				
Gas	**O_2**	**CO_2**	**CH_4**	**NMOC**
Span Gas Value/Range	21.1	19.7	1500.0	847.0
Bias Gas Value	10.00	10.10	310.0	303.0
Bias Check (Zero)	0.1	0.0	1.6	0.6
Bias Check (Span)	10.0	10.1	295.9	310.6
Linearity Bias (Zero)	0.0	0.0	3.8	1.1
Linearity Bias (Span)	10.0	10.1	310.9	305.2
Gas Concentration	%	%	(ppm)	(ppm)
1	0.0	0.0	0.0	0.0
2	10.0	10.1	310.0	303.0
3	21.1	19.7	759.0	493.0
4			1500.0	847.0
Response				
1	0.0	0.0	3.8	1.1
2	10.0	10.1	310.9	305.2
3	21.1	19.7	760.1	491.0
4			1507.1	845.2
Difference				
1	0.0	0.0	3.8	1.1
2	0.0	0.0	0.9	2.2
3	0.0	0.0	1.1	2.0
4	0.0	0.0	7.1	1.8
Results				
Zero Bias	0.47%	0.00%	0.15%	0.06%
Span Bias	0.00%	0.00%	1.00%	0.64%
Max Calibration Error	0.00%	0.00%	0.47%	0.26%

ETC Canyon Pipeline, LLC
Foundation Creek Gas Plant
Rio Blanco County, CO
Flare Outlet
10/06/10

Run 1

Start Time	10/6/10 14:11
Run Length	60
Stop Time	15:11

Calibration Information				
Gas	O_2	CO_2	CH_4	NMOC
Instrument Range	21.1	19.7	1500	847
Span Gas Value	10.00	10.10	310.0	303.0
Calibration				
Pretest Calibration				
Zero%	0.1	0.0	1.6	0.6
Span%	10.0	10.1	295.9	310.6
Post Test Calibration				
Zero%	-0.1	0.0	3.3	1.9
Span%	9.9	10.2	301.4	309.6
Results				
Absolute Bias (Zero)	0.5%	0.0%	0.0%	0.1%
Absolute Bias (Span)	0.5%	0.5%	0.6%	0.5%
Absolute Drift (Zero)	0.9%	0.0%	0.1%	0.2%
Absolute Drift (Span)	0.5%	0.5%	0.4%	0.1%

		Corrected O_2 %	Corrected CO_2 %	Corrected CH_4 ppmvw	Corrected NMOC ppm
		18.9	*0.9*	*759.6*	*507.7*
Run Length (Minutes)	Time	Uncorrected O_2 %	Uncorrected CO_2 %	Uncorrected CH_4 ppmvw	Uncorrected NMOC ppm
		18.8	0.9	728.2	518.8
1	14:11	18.3	1.3	686.6	500.8
2	14:12	15.7	2.9	520.1	337.9
3	14:13	15.5	3.0	348.6	261.0
4	14:14	18.6	1.1	553.7	351.7
5	14:15	20.0	0.4	669.6	403.2
6	14:16	18.7	1.0	464.7	252.6
7	14:17	18.8	1.0	614.6	318.7
8	14:18	19.0	0.8	851.0	643.7
9	14:19	18.7	1.0	597.7	421.4
10	14:20	18.6	1.1	696.6	463.2
11	14:21	19.6	0.6	1060.4	614.7
12	14:22	19.9	0.4	384.3	254.7
13	14:23	17.9	1.4	649.3	458.2
14	14:24	17.1	1.9	456.7	341.7
15	14:25	17.1	1.9	732.2	539.9
16	14:26	18.2	1.3	877.8	615.7
17	14:27	19.1	0.7	869.3	599.9
18	14:28	18.7	1.0	646.0	450.5
19	14:29	18.4	1.1	683.3	484.2
20	14:30	19.3	0.7	860.3	591.8
21	14:31	18.2	1.3	655.1	414.4
22	14:32	18.9	0.8	759.4	493.3
23	14:33	19.0	0.8	991.6	689.1
24	14:34	16.3	2.3	676.0	482.8
25	14:35	17.9	1.4	548.3	358.5
26	14:36	19.2	0.7	738.3	514.0
27	14:37	18.2	1.2	1060.0	693.3
28	14:38	19.5	0.5	646.1	469.4
29	14:39	18.0	1.3	739.9	513.7
30	14:40	19.2	0.7	708.6	474.6
31	14:41	19.8	0.4	734.4	447.1
32	14:42	18.3	1.1	710.0	477.0
33	14:43	19.1	0.7	388.1	292.5
34	14:44	19.9	0.3	831.5	617.8
35	14:45	19.7	0.4	1320.5	951.4
36	14:46	19.2	0.6	832.1	627.8
37	14:47	19.6	0.5	482.9	388.9
38	14:48	19.2	0.6	660.6	527.5
39	14:49	20.0	0.2	540.2	431.8
40	14:50	19.6	0.4	721.2	542.7
41	14:51	18.9	0.8	1059.0	776.6
42	14:52	19.7	0.4	876.8	638.3
43	14:53	20.1	0.2	1006.1	755.4
44	14:54	20.0	0.2	934.7	729.6
45	14:55	19.8	0.3	393.9	321.5
46	14:56	19.0	0.7	301.5	239.5
47	14:57	20.0	0.2	532.9	428.5
48	14:58	19.6	0.4	1176.1	915.5
49	14:59	18.6	0.9	1005.4	751.3
50	15:00	18.2	1.1	614.8	529.8
51	15:01	17.9	1.4	465.1	398.4
52	15:02	18.6	0.9	453.2	340.4
53	15:03	18.9	0.8	990.6	731.1
54	15:04	19.5	0.5	930.2	660.9
55	15:05	17.6	1.5	1074.5	754.8
56	15:06	18.7	0.9	1082.9	765.6
57	15:07	19.5	0.4	652.1	472.7
58	15:08	18.4	1.0	794.3	573.2
59	15:09	19.3	0.6	753.4	557.1
60	15:10	18.7	0.9	627.2	475.0

ETC Canyon Pipeline, LLC
Foundation Creek Gas Plant
Rio Blanco County, CO
Flare Outlet
10/06/10

Run 2

Start Time	10/6/10 15:32
Run Length	60
Stop Time	16:32

Calibration Information				
Gas	O_2	CO_2	CH_4	NMOC
Instrument Range	21.1	19.7	1500	847
Span Gas Value	10.00	10.10	310.0	303.0
Calibration				
Pretest Calibration				
Zero%	-0.1	0.0	3.3	1.9
Span%	9.9	10.2	301.4	309.6
Post Test Calibration				
Zero%	0.0	0.0	1.0	0.1
Span%	9.9	10.1	304.0	313.0
Results				
Absolute Bias (Zero)	0.0%	0.0%	0.2%	0.1%
Absolute Bias (Span)	0.5%	0.0%	0.5%	0.9%
Absolute Drift (Zero)	0.5%	0.0%	0.2%	0.2%
Absolute Drift (Span)	0.0%	0.5%	0.2%	0.4%
	Corrected O_2 %	Corrected CO_2 %	Corrected CH_4 ppmvw	Corrected NMOC ppm
	17.4	*1.5*	*800.7*	*525.2*

Run Length (Minutes)	Time	Uncorrected O_2 %	Uncorrected CO_2 %	Uncorrected CH_4 ppmvw	Uncorrected NMOC ppm
		17.3	1.5	778.5	538.9
1	15:32	16.2	2.5	518.8	360.8
2	15:33	17.5	1.7	728.1	541.3
3	15:34	19.2	0.8	565.5	419.1
4	15:35	19.5	0.5	988.2	645.2
5	15:36	18.4	1.1	1206.2	779.4
6	15:37	18.7	0.9	973.4	681.9
7	15:38	18.6	0.9	858.4	561.9
8	15:39	17.4	1.7	1028.6	669.1
9	15:40	18.0	1.3	852.1	542.3
10	15:41	17.0	1.8	863.4	580.1
11	15:42	18.0	1.4	1180.2	762.5
12	15:43	19.8	0.4	740.8	509.1
13	15:44	19.3	0.6	698.8	481.5
14	15:45	18.5	1.0	710.3	496.5
15	15:46	20.0	0.2	787.8	606.6
16	15:47	16.9	1.8	701.6	493.0
17	15:48	13.4	3.9	955.6	688.8
18	15:49	17.1	1.8	971.4	685.2
19	15:50	17.1	1.7	774.0	486.8
20	15:51	16.3	2.2	713.5	428.8
21	15:52	13.9	3.4	892.6	581.9
22	15:53	16.6	1.9	1029.5	703.4
23	15:54	15.7	2.4	816.1	560.7
24	15:55	17.6	1.3	559.6	359.8
25	15:56	17.2	1.4	573.7	355.7
26	15:57	15.9	2.3	495.2	341.5
27	15:58	17.6	1.2	545.1	386.9
28	15:59	17.2	1.5	625.6	424.4
29	16:00	17.4	1.3	683.9	416.3
30	16:01	17.5	1.3	759.2	488.5
31	16:02	18.3	0.9	737.0	462.7
32	16:03	17.7	1.2	746.2	507.2
33	16:04	17.8	1.1	704.0	460.2
34	16:05	18.1	0.9	606.7	407.0
35	16:06	17.7	1.1	914.1	607.9
36	16:07	16.0	2.1	844.0	591.6
37	16:08	16.9	1.6	797.6	558.0
38	16:09	17.7	1.1	914.6	614.6
39	16:10	17.3	1.4	714.1	508.4
40	16:11	13.6	3.4	636.9	464.2
41	16:12	16.3	2.1	911.1	627.5
42	16:13	18.6	0.6	983.2	672.2
43	16:14	18.3	0.7	950.0	680.7
44	16:15	11.4	4.4	971.8	731.1
45	16:16	13.3	3.7	563.8	432.7
46	16:17	16.4	2.1	232.2	144.6
47	16:18	16.2	1.8	424.5	258.6
48	16:19	17.5	1.3	516.7	378.2
49	16:20	17.6	1.1	557.9	386.6
50	16:21	17.4	1.3	573.9	408.7
51	16:22	17.7	1.2	1124.2	804.4
52	16:23	18.7	0.6	892.5	634.2
53	16:24	14.8	2.8	854.8	624.9
54	16:25	17.1	1.7	1011.9	711.9
55	16:26	18.9	0.5	792.5	537.2
56	16:27	18.6	0.6	477.8	393.8
57	16:28	18.7	0.6	822.6	637.9
58	16:29	19.2	0.4	487.4	401.0
59	16:30	18.3	0.8	972.7	744.3
60	16:31	17.0	1.5	1174.8	901.8

ETC Canyon Pipeline, LLC
Foundation Creek Gas Plant
Rio Blanco County, CO
Flare Outlet
10/06/10

Run 3

Start Time	10/6/10 17:20
Run Length	60
Stop Time	18:20

Calibration Information				
Gas	O_2	CO_2	CH_4	NMOC
Instrument Range	21.1	19.7	1500	847
Span Gas Value	10.00	10.10	310.0	303.0
Calibration				
Pretest Calibration				
Zero%	0.0	0.0	1.0	0.1
Span%	9.9	10.1	304.0	313.0
Post Test Calibration				
Zero%	0.0	0.0	1.4	0.1
Span%	10.2	10.2	295.4	296.3
Results				
Absolute Bias (Zero)	0.0%	0.0%	0.2%	0.1%
Absolute Bias (Span)	0.9%	0.5%	1.0%	1.1%
Absolute Drift (Zero)	0.0%	0.0%	0.0%	0.0%
Absolute Drift (Span)	1.4%	0.5%	0.6%	2.0%
	Corrected O_2 %	Corrected CO_2 %	Corrected CH_4 ppmvw	Corrected NMOC ppm
	18.9	***1.3***	***745.4***	***500.1***

Run Length (Minutes)	Time	Uncorrected O_2 %	Uncorrected CO_2 %	Uncorrected CH_4 ppmvw	Uncorrected NMOC ppm
		19.0	1.3	719.0	502.8
1	17:20	10.8	5.1	251.4	186.0
2	17:21	15.1	3.1	341.0	218.0
3	17:22	19.0	0.1	242.8	137.8
4	17:23	19.8	0.1	544.4	364.4
5	17:24	16.9	1.7	526.1	331.1
6	17:25	12.9	4.0	466.3	316.6
7	17:26	18.3	1.5	366.0	247.9
8	17:27	18.3	2.9	741.2	488.8
9	17:28	13.1	4.9	1022.5	674.5
10	17:29	13.4	3.9	790.8	536.6
11	17:30	13.7	3.8	481.8	336.7
12	17:31	14.6	3.6	574.3	386.2
13	17:32	17.3	2.2	857.0	559.4
14	17:33	16.3	2.8	752.1	478.7
15	17:34	15.8	2.7	503.5	349.1
16	17:35	16.3	2.7	567.1	356.2
17	17:36	13.4	4.5	799.9	514.5
18	17:37	18.1	1.7	310.0	252.6
19	17:38	18.9	1.6	832.0	539.5
20	17:39	19.7	1.0	904.3	569.1
21	17:40	15.9	3.3	950.6	674.8
22	17:41	19.1	1.5	660.0	455.0
23	17:42	21.6	0.1	300.0	232.7
24	17:43	21.1	0.3	780.3	539.4
25	17:44	20.7	0.5	275.6	203.9
26	17:45	20.8	0.5	574.6	383.1
27	17:46	19.7	0.9	955.4	663.1
28	17:47	20.6	0.4	1169.7	812.1
29	17:48	19.9	0.7	1097.3	777.0
30	17:49	20.2	0.5	797.4	554.7
31	17:50	20.3	0.6	830.8	583.1
32	17:51	20.9	0.3	861.2	632.1
33	17:52	20.5	0.5	750.4	535.8
34	17:53	20.6	0.4	854.4	584.1
35	17:54	21.0	0.2	735.6	515.1
36	17:55	21.0	0.2	600.9	433.1
37	17:56	20.8	0.3	347.5	274.6
38	17:57	20.8	0.3	390.9	269.5
39	17:58	20.8	0.4	650.7	450.3
40	17:59	20.8	0.3	631.3	465.6
41	18:00	21.0	0.3	710.1	550.9
42	18:01	20.6	0.5	993.5	683.6
43	18:02	20.8	0.4	603.7	422.4
44	18:03	21.1	0.2	959.4	702.0
45	18:04	20.8	0.3	912.4	665.6
46	18:05	19.8	0.5	449.2	325.2
47	18:06	21.1	0.4	518.1	380.1
48	18:07	20.3	0.6	669.8	471.6
49	18:08	20.9	0.4	802.4	578.7
50	18:09	20.8	0.4	748.5	543.0
51	18:10	21.1	0.3	841.0	593.2
52	18:11	19.8	0.9	886.8	645.3
53	18:12	20.1	0.7	1089.7	780.4
54	18:13	19.9	0.8	1139.6	786.2
55	18:14	20.3	0.6	878.8	620.5
56	18:15	21.0	0.4	1125.3	793.8
57	18:16	19.3	1.4	902.8	653.1
58	18:17	19.9	0.9	1010.9	735.5
59	18:18	20.0	0.9	879.3	675.1
60	18:19	19.8	0.8	928.3	676.6

Rifle Boulton Station Flare

ETC Canyon Pipeline, LLC
Rifle Boulton Station
Garfield County, CO
Flare Inlet
10/07/10

Field Reference Method Data					
	Run #	1	2	3	Average
	Start Time	12:17	13:39	14:57	
	Stop Time	13:17	14:39	15:57	
	Sample Duration (minutes)	60	60	60	
D_S	Stack Diameter (inches)	4.0	4.0	4.0	4.0
$\sqrt{\Delta P_{AVG}}$	Average (Delta P)^{½} (" H_2O)^{½}	0.094	0.080	0.085	0.086
C_P	Pitot Tube Constant (unitless)	0.82	0.82	0.82	0.82
T_S	Stack Temperature (°F)	86	90	93	90
P_{bar}	Barometric Pressure (mbar)	810	810	810	810
P_{bar}	Barometric Pressure (" Hg)	23.92	23.92	23.92	23.92
Ps	Stack Pressure (" H_2O)	0.0	0.0	0.0	0.0
O_2%vd	O_2 (%vd)	0.7	1.7	1.5	1.3
CO_2%vd	CO_2 (%vd)	3.4	4.8	4.6	4.3
N_2%vd	N_2 (%vd)	95.9	93.5	94.0	94.5

Laboratory Data					
MW	Run #	1	2	3	Average
30.07	C2 mole %	7.75	2.53	2.15	4.14
44.09	C3 mole %	1.62	2.23	2.57	2.14
58.12	C4 mole %	1.58	1.50	1.43	1.50
72.16	C5 mole %	0.66	0.68	0.71	0.68
86.19	C6 mole %	2.44	2.17	2.64	2.42

Reference Method Calculations					
	Run #	1	2	3	Average
B_{ws}	Saturated Moisture Content (%/100)	0.052	0.059	0.065	0.059
M_D	Molecular Weight Dry (lb/lb-mole)	28.57	28.83	28.79	28.73
M_A	Molecular Weight Wet (lb/lb-mole)	28.02	28.19	28.08	28.10
V_S	Gas Velocity (ft/sec)	6.0	5.1	5.4	5.5
F_{ACFM}	Gas Flow (acfm)	31.2	26.6	28.4	28.7
F_{DSCFM}	Gas Flow (dscfm)	22.8	19.2	20.3	20.8
lb/hr	Gas Flow (lb/hr)	105	89	95	97
lb/hr	NMOC (lb/hr)	23.3	14.9	17.1	18.4

DRE Calculations					
	Run #	1	2	3	Average
lb/hr	Outlet NMOC (lb/hr as C_3H_8)	0.9	0.7	0.4	0.7
lb/hr	Inlet NMOC (lb/hr)	23.3	14.9	17.1	18.4
DRE (%)	VOC DRE (%)	96.1%	95.2%	97.5%	96.3%

ETC Canyon Pipeline, LLC
Rifle Boulton Station
Garfield County, CO
Flare Outlet
10/7/2010

Field Reference Method Data					
	Run #	1	2	3	Average
	Start Time	12:17	13:39	14:57	
	Stop Time	13:17	14:39	15:57	
	Sample Duration (minutes)	60	60	60	
hrs	Hours of Operation / Year	8,760	8,760	8,760	8,760
D_S	Stack Diameter (inches)	40.5	40.5	40.5	40.5
$\sqrt{\Delta P_{AVG}}$	Average (Delta P)^{½} (" H_2O)^{½}	0.1011	0.0960	0.0917	0.0963
C_P	Pitot Tube Constant (unitless)	0.82	0.82	0.82	0.82
T_S	Stack Temperature (°F)	86	108	109	101
P_{bar}	Barometric Pressure (mbar)	810	810	810	810
P_{bar}	Barometric Pressure (" Hg)	23.92	23.92	23.92	23.92
Ps	Stack Pressure (" H_2O)	0.0	0.0	0.0	0.0
Y_d	Meter Y Factor (unitless)	0.980	0.980	0.980	0.980
T_m	Meter Temperature (°F)	78	81	84	81
V_m	Sample Volume (ft^3)	41.667	41.781	41.300	41.583
ΔH	Orifice Pressure Delta H (" H_2O)	1.0	1.0	1.0	1.0
V_{lc}	Moisture (g)	6.4	5.1	5.1	5.5
O_2%vd	O_2 (%vd)	20.1	20.2	20.3	20.2
CO_2%vd	CO_2 (%vd)	0.1	0.1	0.1	0.1
N_2%vd	N_2 (%vd)	79.8	79.7	79.6	79.7
wet	CH_4 (ppmvw)	214.6	248.7	157.5	206.9
wet	NMOC (ppmvw as C_3H_8)	50.1	42.5	26.3	39.6

Reference Method Calculations					
	Run #	1	2	3	Average
V_{mstd}	Sample Volume (dscf)	32.111	32.057	31.513	31.894
V_{wstd}	Moisture Volume (scf)	0.30	0.24	0.24	0.26
B_{ws}	Moisture Content (%/100)	0.009	0.007	0.008	0.008
M_D	Molecular Weight Dry (lb/lb-mole)	28.82	28.82	28.82	28.82
M_A	Molecular Weight Wet (lb/lb-mole)	28.72	28.74	28.74	28.73
V_S	Gas Velocity (ft/sec)	6.3	6.1	5.9	6.1
F_{ACFM}	Gas Flow (acfm)	3,395	3,289	3,143	3,275
F_{DSCFM}	Gas Flow (dscfm)	2,602	2,424	2,313	2,446
lb/hr	Gas Flow (lb/hr)	11,749	10,931	10,430	11,037
dry	CH_4 (ppmvd)	216.6	246.8	156.3	206.6
lb/hr	CH_4 (lb/hr)	1.4	1.5	0.9	1.3
tpy	CH_4 (tons/year)	6.2	6.5	4.0	5.6
dry	NMOC (ppmvd as C_3H_8)	50.5	42.8	26.5	40.0
lb/hr	NMOC (lb/hr as C_3H_8)	0.9	0.7	0.4	0.7
tpy	NMOC (tons/year as C_3H_8)	4.0	3.1	1.8	3.0

ETC Canyon Pipeline, LLC
Rifle Boulton Station
Garfield County, CO
Flare Outlet
10/07/10

Linearity Information				
Gas	**O_2**	**CO_2**	**CH_4**	**NMOC**
Span Gas Value/Range	21.1	19.7	1500.0	84.5
Bias Gas Value	10.00	10.10	310.0	30.0
Bias Check (Zero)	0.0	0.1	1.2	1.7
Bias Check (Span)	10.0	10.1	308.8	32.4
Linearity Bias (Zero)	0.0	0.0	2.4	0.1
Linearity Bias (Span)	10.0	10.0	311.3	30.9
Gas Concentration	%	%	(ppm)	(ppm)
1	0.0	0.0	0.0	0.0
2	10.0	10.1	310.0	30.0
3	21.1	19.7	759.0	50.1
4			1500.0	84.5
Response				
1	0.0	0.0	2.4	0.1
2	10.0	10.0	311.3	30.9
3	21.1	19.7	766.6	50.8
4			1507.9	85.1
Difference				
1	0.0	0.0	2.4	0.1
2	0.0	0.1	1.3	0.9
3	0.0	0.0	7.6	0.7
4	0.0	0.0	7.9	0.6
Results				
Zero Bias	0.00%	0.25%	0.08%	1.89%
Span Bias	0.00%	0.51%	0.17%	1.78%
Max Calibration Error	0.00%	0.51%	0.53%	1.07%

ETC Canyon Pipeline, LLC
Rifle Boulton Station
Garfield County, CO
Flare Outlet
10/07/10

Run 1

Start Time	10/7/10 12:17
Run Length	60
Stop Time	13:17

Calibration Information				
Gas	O_2	CO_2	CH_4	NMOC
Instrument Range	21.1	19.7	1500	85
Span Gas Value	10.00	10.10	310.0	30.0
Calibration				
Pretest Calibration				
Zero%	0.0	0.1	1.2	1.7
Span%	10.0	10.1	308.8	32.4
Post Test Calibration				
Zero%	0.0	0.0	0.8	0.6
Span%	9.9	10.1	301.2	30.6
Results				
Absolute Bias (Zero)	0.0%	0.0%	0.1%	0.6%
Absolute Bias (Span)	0.5%	0.5%	0.7%	0.4%
Absolute Drift (Zero)	0.0%	0.3%	0.0%	1.3%
Absolute Drift (Span)	0.5%	0.0%	0.5%	2.1%
	Corrected O_2 %	Corrected CO_2 %	Corrected CH_4 ppmvw	Corrected NMOC ppm
	20.1	*0.1*	*214.6*	*50.1*

Run Length (Minutes)	Time	Uncorrected O_2 %	Uncorrected CO_2 %	Uncorrected CH_4 ppmvw	Uncorrected NMOC ppm
		20.0	0.1	211.4	51.8
1	12:17	20.1	0.1	203.1	44.4
2	12:18	20.1	0.1	232.0	54.0
3	12:19	20.1	0.1	153.6	35.6
4	12:20	20.1	0.1	240.4	57.7
5	12:21	20.1	0.1	181.0	42.3
6	12:22	20.1	0.1	188.4	43.3
7	12:23	20.1	0.1	195.5	47.3
8	12:24	20.0	0.1	191.1	49.2
9	12:25	20.0	0.2	165.9	42.7
10	12:26	20.0	0.2	194.5	48.5
11	12:27	20.0	0.2	265.6	64.7
12	12:28	20.0	0.2	228.7	60.1
13	12:29	19.9	0.2	202.7	56.1
14	12:30	20.0	0.2	236.5	62.7
15	12:31	20.0	0.1	232.3	63.5
16	12:32	20.1	0.1	191.5	53.9
17	12:33	20.0	0.1	143.5	41.1
18	12:34	20.0	0.2	177.5	51.0
19	12:35	20.1	0.1	221.7	56.4
20	12:36	20.1	0.1	155.3	42.2
21	12:37	20.1	0.1	110.7	30.7
22	12:38	20.0	0.2	130.7	35.9
23	12:39	20.0	0.2	102.2	29.5
24	12:40	19.9	0.2	230.4	52.8
25	12:41	20.0	0.2	167.5	42.1
26	12:42	20.0	0.1	210.5	49.6
27	12:43	20.1	0.1	252.9	59.1
28	12:44	20.1	0.1	168.0	40.6
29	12:45	20.1	0.1	111.7	30.3
30	12:46	20.0	0.1	195.3	47.2
31	12:47	20.0	0.1	245.2	59.2
32	12:48	20.0	0.2	236.1	57.5
33	12:49	20.1	0.1	244.1	62.2
34	12:50	20.0	0.1	202.7	54.8
35	12:51	19.9	0.2	165.4	45.9
36	12:52	19.9	0.2	207.4	55.4
37	12:53	19.9	0.2	230.9	62.0
38	12:54	19.9	0.2	232.5	60.5
39	12:55	19.9	0.2	253.9	64.4
40	12:56	19.9	0.2	306.4	70.7
41	12:57	20.0	0.2	241.2	54.9
42	12:58	20.0	0.2	283.7	63.5
43	12:59	20.0	0.1	190.2	43.1
44	13:00	19.9	0.2	202.5	45.5
45	13:01	19.9	0.2	168.7	38.4
46	13:02	19.9	0.2	270.5	57.8
47	13:03	19.9	0.2	284.1	60.4
48	13:04	19.9	0.2	253.9	54.3
49	13:05	20.0	0.1	215.9	48.7
50	13:06	20.0	0.1	143.8	34.3
51	13:07	19.9	0.1	180.0	40.5
52	13:08	19.9	0.2	242.0	56.2
53	13:09	19.9	0.2	259.0	63.4
54	13:10	19.9	0.2	261.3	68.0
55	13:11	19.9	0.2	241.8	66.3
56	13:12	19.9	0.2	237.7	62.1
57	13:13	19.9	0.2	264.9	61.6
58	13:14	19.9	0.2	257.2	57.6
59	13:15	19.9	0.2	237.7	52.5
60	13:16	20.0	0.2	245.6	52.9

ETC Canyon Pipeline, LLC
Rifle Boulton Station
Garfield County, CO
Flare Outlet
10/07/10

Run 2

Start Time	10/7/10 13:39
Run Length	60
Stop Time	14:39

Calibration Information				
Gas	O_2	CO_2	CH_4	NMOC
Instrument Range	21.1	19.7	1500	85
Span Gas Value	10.00	10.10	310.0	30.0
Calibration				
Pretest Calibration				
Zero%	0.0	0.0	0.8	0.6
Span%	9.9	10.1	301.2	30.6
Post Test Calibration				
Zero%	0.0	0.0	1.8	0.0
Span%	9.9	10.0	302.4	30.0
Results				
Absolute Bias (Zero)	0.0%	0.0%	0.0%	0.1%
Absolute Bias (Span)	0.5%	0.0%	0.6%	1.1%
Absolute Drift (Zero)	0.0%	0.0%	0.1%	0.7%
Absolute Drift (Span)	0.0%	0.5%	0.1%	0.7%
	Corrected O_2 %	Corrected CO_2 %	Corrected CH_4 ppmvw	Corrected NMOC ppm
	20.2	*0.1*	*248.7*	*42.5*

Run Length (Minutes)	Time	Uncorrected O_2 %	Uncorrected CO_2 %	Uncorrected CH_4 ppmvw	Uncorrected NMOC ppm
		20.0	0.1	242.3	42.8
1	13:39	20.0	0.1	234.8	47.3
2	13:40	20.0	0.1	289.9	55.1
3	13:41	20.0	0.1	368.1	74.6
4	13:42	20.0	0.1	344.2	73.7
5	13:43	19.9	0.1	264.3	61.9
6	13:44	20.0	0.1	280.5	64.4
7	13:45	20.1	0.0	322.9	67.8
8	13:46	20.1	0.0	320.5	62.7
9	13:47	20.0	0.1	140.8	28.6
10	13:48	20.1	0.1	135.1	25.6
11	13:49	20.1	0.0	141.7	27.1
12	13:50	20.0	0.1	102.9	20.5
13	13:51	20.0	0.1	127.2	23.5
14	13:52	20.0	0.1	229.4	40.0
15	13:53	20.0	0.1	204.8	36.5
16	13:54	20.0	0.1	197.1	35.9
17	13:55	19.9	0.1	288.4	50.8
18	13:56	19.9	0.1	277.9	49.7
19	13:57	19.8	0.2	252.5	50.6
20	13:58	19.9	0.1	312.3	65.5
21	13:59	19.9	0.2	322.4	66.8
22	14:00	19.9	0.1	288.5	62.3
23	14:01	19.9	0.2	332.4	69.8
24	14:02	19.9	0.1	271.4	55.3
25	14:03	20.0	0.1	415.1	74.8
26	14:04	20.0	0.1	369.7	59.8
27	14:05	20.0	0.1	296.5	47.0
28	14:06	20.0	0.1	176.6	28.8
29	14:07	20.0	0.1	229.6	34.9
30	14:08	19.9	0.1	207.4	32.9
31	14:09	19.9	0.1	239.3	36.6
32	14:10	19.9	0.1	277.4	40.7
33	14:11	19.9	0.1	289.1	40.7
34	14:12	19.9	0.1	264.6	38.3
35	14:13	19.9	0.1	245.8	36.1
36	14:14	19.8	0.2	277.8	41.1
37	14:15	19.8	0.2	314.7	49.7
38	14:16	20.0	0.1	334.6	57.0
39	14:17	19.9	0.1	339.2	59.3
40	14:18	19.8	0.2	352.2	63.7
41	14:19	19.8	0.1	390.3	72.8
42	14:20	20.0	0.1	288.1	53.5
43	14:21	20.2	0.0	275.4	45.1
44	14:22	20.0	0.0	325.0	48.8
45	14:23	20.1	0.0	138.6	21.1
46	14:24	20.1	0.0	106.7	21.0
47	14:25	20.1	0.0	75.8	13.5
48	14:26	20.2	0.0	42.9	9.3
49	14:27	20.2	0.0	24.1	4.3
50	14:28	20.2	0.0	164.3	25.4
51	14:29	20.1	0.0	73.1	11.7
52	14:30	20.0	0.1	136.7	18.3
53	14:31	20.1	0.0	247.8	32.4
54	14:32	20.1	0.0	202.6	27.6
55	14:33	20.0	0.0	191.2	25.7
56	14:34	20.1	0.0	215.7	29.9
57	14:35	20.0	0.1	216.6	30.8
58	14:36	19.9	0.1	184.9	28.8
59	14:37	20.1	0.0	249.0	40.6
60	14:38	20.1	0.0	312.2	50.1

ETC Canyon Pipeline, LLC
Rifle Boulton Station
Garfield County, CO
Flare Outlet
10/07/10

Run 3

Start Time	10/7/10 14:57
Run Length	60
Stop Time	15:57

Calibration Information				
Gas	O_2	CO_2	CH_4	NMOC
Instrument Range	21.1	19.7	1500	85
Span Gas Value	10.00	10.10	310.0	30.0
Calibration				
Pretest Calibration				
Zero%	0.0	0.0	1.8	0.0
Span%	9.9	10.0	302.4	30.0
Post Test Calibration				
Zero%	0.1	-0.1	0.9	0.6
Span%	10.0	9.8	304.1	30.1
Results				
Absolute Bias (Zero)	0.5%	0.5%	0.1%	0.6%
Absolute Bias (Span)	0.0%	0.9%	0.5%	0.9%
Absolute Drift (Zero)	0.5%	0.5%	0.1%	0.7%
Absolute Drift (Span)	0.5%	0.9%	0.1%	0.1%
	Corrected O_2 %	Corrected CO_2 %	Corrected CH_4 ppmvw	Corrected NMOC ppm
	20.3	*0.1*	*157.5*	*26.3*

Run Length (Minutes)	Time	Uncorrected O_2 %	Uncorrected CO_2 %	Uncorrected CH_4 ppmvw	Uncorrected NMOC ppm
		20.2	0.0	154.7	26.4
1	14:57	20.4	0.0	152.0	32.4
2	14:58	20.3	0.0	97.6	22.3
3	14:59	20.3	0.0	144.9	27.1
4	15:00	20.4	0.0	174.3	33.3
5	15:01	20.4	0.0	140.1	28.2
6	15:02	20.4	0.0	78.8	15.8
7	15:03	20.4	0.0	34.3	6.1
8	15:04	20.3	0.0	87.3	13.4
9	15:05	20.3	0.0	175.2	28.6
10	15:06	20.3	0.0	190.8	27.4
11	15:07	20.3	0.0	200.3	29.6
12	15:08	20.3	0.0	100.6	16.9
13	15:09	20.3	0.0	267.2	38.4
14	15:10	20.2	0.0	176.2	27.0
15	15:11	20.3	0.0	144.8	24.5
16	15:12	20.3	0.0	202.7	35.9
17	15:13	20.3	0.0	121.4	24.1
18	15:14	20.3	0.0	92.4	20.3
19	15:15	20.0	0.0	126.5	26.0
20	15:16	20.0	0.0	173.2	30.8
21	15:17	20.0	0.0	147.8	24.6
22	15:18	19.8	0.0	104.0	17.2
23	15:19	19.8	0.0	121.6	19.9
24	15:20	19.9	0.0	131.3	21.9
25	15:21	19.8	0.0	109.9	19.2
26	15:22	19.8	0.0	94.6	19.1
27	15:23	19.9	0.0	62.6	12.4
28	15:24	19.9	0.0	44.9	5.4
29	15:25	20.0	0.0	189.7	23.7
30	15:26	20.1	0.0	216.6	31.3
31	15:27	20.2	0.0	205.5	34.8
32	15:28	20.1	0.0	129.5	16.5
33	15:29	20.3	0.0	132.7	20.4
34	15:30	20.6	0.0	143.9	21.8
35	15:31	20.6	0.0	162.6	23.7
36	15:32	20.7	0.0	142.1	24.4
37	15:33	20.7	0.0	170.7	31.5
38	15:34	20.8	0.0	151.9	26.0
39	15:35	20.7	0.0	106.8	21.5
40	15:36	20.7	0.1	120.6	24.6
41	15:37	20.7	0.0	129.1	25.0
42	15:38	20.6	0.1	102.3	19.3
43	15:39	20.5	0.0	111.5	20.5
44	15:40	20.5	0.0	169.3	25.7
45	15:41	20.5	0.0	180.8	26.8
46	15:42	20.4	0.0	160.6	27.3
47	15:43	20.4	0.0	208.3	31.1
48	15:44	20.3	0.0	233.3	34.1
49	15:45	20.3	0.0	243.6	38.1
50	15:46	20.4	0.0	163.0	30.3
51	15:47	19.4	0.0	259.5	44.0
52	15:48	19.7	0.0	191.5	31.3
53	15:49	19.6	0.0	211.7	40.4
54	15:50	19.5	0.1	267.0	50.0
55	15:51	19.5	0.1	141.7	27.9
56	15:52	19.5	0.1	155.7	31.3
57	15:53	19.5	0.1	200.2	36.4
58	15:54	19.4	0.0	193.1	34.3
59	15:55	19.4	0.1	156.6	25.5
60	15:56	19.4	0.0	233.5	36.4

Greasewood Gas Plant Flare

ETC Canyon Pipeline, LLC
Greasewood Gas Plant
Rio Blanco County, CO
are Inlet
10/08/10

Field Reference Method Data					
	Run #	1	2	3	Average
	Start Time	9:21	10:41	11:59	
	Stop Time	10:21	11:41	12:59	
	Sample Duration (minutes)	60	60	60	
D_S	Stack Diameter (inches)	4.0	4.0	4.0	4.0
$\sqrt{\Delta P_{AVG}}$	Average (Delta P)^{½} (" H_2O)^{½}	0.041	0.043	0.041	0.042
C_P	Pitot Tube Constant (unitless)	0.82	0.82	0.82	0.82
T_S	Stack Temperature (°F)	56	69	70	65
P_{bar}	Barometric Pressure (mbar)	779	779	779	779
P_{bar}	Barometric Pressure (" Hg)	23.00	23.00	23.00	23.00
Ps	Stack Pressure (" H_2O)	0.0	0.0	0.0	0.0
O_2%vd	O_2 (%vd)	22.0	22.0	22.0	22.0
CO_2%vd	CO_2 (%vd)	0.1	0.1	0.1	0.1
N_2%vd	N_2 (%vd)	78.0	78.0	77.9	78.0

Laboratory Data					
MW	Run #	1	2	3	Average
30.07	C2 mole %	0.01	0.00	0.01	0.01
44.09	C3 mole %	0.01	0.00	0.00	0.00
58.12	C4 mole %	0.00	0.00	0.00	0.00
72.16	C5 mole %	0.00	0.00	0.00	0.00
86.19	C6 mole %	0.00	0.00	0.00	0.00

Reference Method Calculations					
	Run #	1	2	3	Average
B_{ws}	Saturated Moisture Content (%/100)	0.020	0.031	0.032	0.028
M_D	Molecular Weight Dry (lb/lb-mole)	28.89	28.89	28.89	28.89
M_A	Molecular Weight Wet (lb/lb-mole)	28.67	28.55	28.54	28.59
V_S	Gas Velocity (ft/sec)	2.5	2.7	2.6	2.6
F_{ACFM}	Gas Flow (acfm)	13.3	14.2	13.5	13.7
F_{DSCFM}	Gas Flow (dscfm)	10.3	10.5	10.0	10.3
lb/hr	Gas Flow (lb/hr)	47	48	46	47
lb/hr	NMOC (lb/hr)	0.01	0.00	0.00	0.01

DRE Calculations					
	Run #	1	2	3	Average
lb/hr	Outlet NMOC (lb/hr as C_3H_8)	0.1	0.2	0.2	0.2
lb/hr	Inlet NMOC (lb/hr)	0.01	0.00	0.00	0.01
DRE (%)	VOC DRE (%)	0.0%	0.0%	0.0%	0.0%

ETC Canyon Pipeline, LLC
Greasewood Gas Plant
Rio Blanco County, CO
Flare Outlet
10/8/2010

Field Reference Method Data					
	Run #	1	2	3	Average
	Start Time	9:21	10:41	11:59	
	Stop Time	10:21	11:41	12:59	
	Sample Duration (minutes)	60	60	60	
hrs	Hours of Operation / Year	8,760	8,760	8,760	8,760
D_S	Stack Diameter (inches)	40.5	40.5	40.5	40.5
$\sqrt{\Delta P_{AVG}}$	Average (Delta P)^{½} (" H_2O)^{½}	0.0603	0.0577	0.0608	0.0596
C_P	Pitot Tube Constant (unitless)	0.82	0.82	0.82	0.82
T_S	Stack Temperature (°F)	78	82	88	82
P_{bar}	Barometric Pressure (mbar)	779	779	779	779
P_{bar}	Barometric Pressure (" Hg)	23.00	23.00	23.00	23.00
Ps	Stack Pressure (" H_2O)	0.0	0.0	0.0	0.0
Y_d	Meter Y Factor (unitless)	0.980	0.980	0.980	0.980
T_m	Meter Temperature (°F)	54	53	60	55
V_m	Sample Volume (ft^3)	45.953	42.513	41.838	43.435
ΔH	Orifice Pressure Delta H (" H_2O)	1.0	1.0	1.0	1.0
V_{lc}	Moisture (g)	12.6	5.1	8.0	8.6
O_2%vd	O_2 (%vd)	20.8	20.2	20.2	20.4
CO_2%vd	CO_2 (%vd)	0.0	0.0	0.0	0.0
N_2%vd	N_2 (%vd)	79.2	79.8	79.8	79.6
wet	CH_4 (ppmvw)	144.6	187.7	215.3	182.6
wet	NMOC (ppmvw as C_3H_8)	12.2	16.8	18.9	16.0

Reference Method Calculations					
	Run #	1	2	3	Average
V_{mstd}	Sample Volume (dscf)	35.681	33.091	32.107	33.626
V_{wstd}	Moisture Volume (scf)	0.59	0.24	0.38	0.40
B_{ws}	Moisture Content (%/100)	0.016	0.007	0.012	0.012
M_D	Molecular Weight Dry (lb/lb-mole)	28.83	28.81	28.81	28.82
M_A	Molecular Weight Wet (lb/lb-mole)	28.65	28.73	28.68	28.69
V_S	Gas Velocity (ft/sec)	3.8	3.7	3.9	3.8
F_{ACFM}	Gas Flow (acfm)	2,051	1,967	2,087	2,035
F_{DSCFM}	Gas Flow (dscfm)	1,524	1,463	1,528	1,505
lb/hr	Gas Flow (lb/hr)	6,913	6,592	6,908	6,804
dry	CH_4 (ppmvd)	147.0	186.4	212.8	182.1
lb/hr	CH_4 (lb/hr)	0.6	0.7	0.8	0.7
tpy	CH_4 (tons/year)	2.5	3.0	3.6	3.0
dry	NMOC (ppmvd as C_3H_8)	12.4	17.0	19.1	16.2
lb/hr	NMOC (lb/hr as C_3H_8)	0.1	0.2	0.2	0.2
tpy	NMOC (tons/year as C_3H_8)	0.6	0.7	0.9	0.7

ETC Canyon Pipeline, LLC
Greasewood Gas Plant
Rio Blanco County, CO
Flare Outlet
10/08/10

Linearity Information				
Gas	O_2	CO_2	CH_4	NMOC
Span Gas Value/Range	21.1	19.7	1500.0	84.5
Bias Gas Value	10.00	10.10	310.0	30.0
Bias Check (Zero)	0.0	0.0	1.3	0.6
Bias Check (Span)	9.9	10.2	305.0	30.6
Linearity Bias (Zero)	0.0	0.0	0.8	0.0
Linearity Bias (Span)	10.0	10.1	306.5	30.6
Gas Concentration	%	%	(ppm)	(ppm)
1	0.0	0.0	0.0	0.0
2	10.0	10.1	310.0	30.0
3	21.1	19.7	759.0	50.1
4			1500.0	84.5
Response				
1	0.0	0.0	0.8	0.0
2	10.0	10.1	306.5	30.6
3	21.1	19.7	765.9	50.0
4			1507.5	84.5
Difference				
1	0.0	0.0	0.8	0.0
2	0.0	0.0	3.5	0.6
3	0.0	0.0	6.9	0.1
4	0.0	0.0	7.5	0.0
Results				
Zero Bias	0.00%	0.00%	0.03%	0.71%
Span Bias	0.47%	0.51%	0.10%	0.00%
Max Calibration Error	0.00%	0.00%	0.50%	0.71%

ETC Canyon Pipeline, LLC
Greasewood Gas Plant
Rio Blanco County, CO
Flare Outlet
10/08/10

Run 1

Start Time	10/8/10 9:21
Run Length	60
Stop Time	10:21

Calibration Information				
Gas	O_2	CO_2	CH_4	NMOC
Instrument Range	21.1	19.7	1500	85
Span Gas Value	10.00	10.10	310.0	30.0
Calibration				
Pretest Calibration				
Zero%	0.0	0.0	1.3	0.6
Span%	9.9	10.2	305.0	30.6
Post Test Calibration				
Zero%	0.1	0.0	0.8	0.1
Span%	10.0	10.1	311.0	31.1
Results				
Absolute Bias (Zero)	0.5%	0.0%	0.0%	0.1%
Absolute Bias (Span)	0.0%	0.0%	0.3%	0.6%
Absolute Drift (Zero)	0.5%	0.0%	0.0%	0.6%
Absolute Drift (Span)	0.5%	0.5%	0.4%	0.6%

		Corrected O_2 %	Corrected CO_2 %	Corrected CH_4 ppmvw	Corrected NMOC ppm
		20.8	***0.0***	***144.6***	***12.2***
Run Length (Minutes)	**Time**	**Uncorrected O_2 %**	**Uncorrected CO_2 %**	**Uncorrected CH_4 ppmvw**	**Uncorrected NMOC ppm**
		20.6	0.0	144.3	12.8
1	9:21	20.6	0.0	149.2	13.7
2	9:22	20.6	0.0	124.7	11.8
3	9:23	20.6	0.0	115.3	10.3
4	9:24	20.6	0.0	119.1	11.3
5	9:25	20.6	0.0	130.1	11.4
6	9:26	20.6	0.0	126.4	11.7
7	9:27	20.6	0.0	137.1	11.9
8	9:28	20.6	0.0	121.5	11.1
9	9:29	20.6	0.0	140.3	12.4
10	9:30	20.6	-0.1	168.6	15.3
11	9:31	20.6	0.0	165.9	14.4
12	9:32	20.6	0.0	96.4	9.1
13	9:33	20.6	0.0	145.5	12.0
14	9:34	20.5	0.0	120.0	10.9
15	9:35	20.6	0.0	121.7	10.6
16	9:36	20.6	-0.1	121.3	11.1
17	9:37	20.6	0.0	126.3	11.6
18	9:38	20.6	-0.1	100.6	9.5
19	9:39	20.6	0.0	119.6	11.2
20	9:40	20.6	0.0	111.3	10.2
21	9:41	20.6	0.0	141.0	12.6
22	9:42	20.6	0.0	150.0	13.0
23	9:43	20.6	0.0	134.5	11.7
24	9:44	20.6	0.0	142.2	12.4
25	9:45	20.6	0.0	129.1	11.0
26	9:46	20.6	0.0	95.8	8.7
27	9:47	20.6	0.0	92.1	9.0
28	9:48	20.6	0.0	130.5	11.8
29	9:49	20.6	0.0	142.4	12.2
30	9:50	20.6	0.0	99.6	8.6
31	9:51	20.6	0.0	155.3	13.4
32	9:52	20.6	0.0	108.9	10.3
33	9:53	20.6	0.0	107.7	9.0
34	9:54	20.6	0.0	164.3	13.8
35	9:55	20.6	0.0	237.3	20.0
36	9:56	20.6	0.0	158.0	13.5
37	9:57	20.6	0.0	161.3	13.1
38	9:58	20.6	0.0	236.7	19.3
39	9:59	20.6	0.0	156.4	13.2
40	10:00	20.6	0.0	159.3	14.5
41	10:01	20.6	0.0	125.3	12.0
42	10:02	20.6	0.0	118.3	10.9
43	10:03	20.6	0.0	116.7	9.9
44	10:04	20.6	0.0	94.6	8.3
45	10:05	20.6	-0.1	100.0	9.4
46	10:06	20.6	-0.1	147.5	13.4
47	10:07	20.6	0.0	216.8	18.4
48	10:08	20.6	0.0	235.8	20.5
49	10:09	20.6	0.0	240.6	19.8
50	10:10	20.6	0.0	201.3	18.2
51	10:11	20.6	0.0	147.2	14.0
52	10:12	20.6	0.0	161.8	15.8
53	10:13	20.6	0.0	117.7	10.2
54	10:14	20.6	0.0	135.8	11.1
55	10:15	20.6	0.0	117.3	10.9
56	10:16	20.7	0.0	165.9	14.6
57	10:17	20.6	0.0	165.0	15.5
58	10:18	20.6	0.0	210.5	18.7
59	10:19	20.6	0.0	228.0	20.3
60	10:20	20.7	-0.1	146.2	13.5

ETC Canyon Pipeline, LLC
Greasewood Gas Plant
Rio Blanco County, CO
Flare Outlet
10/08/10

Run 2

Start Time	10/8/10 10:41
Run Length	60
Stop Time	11:41

Calibration Information				
Gas	O_2	CO_2	CH_4	NMOC
Instrument Range	21.1	19.7	1500	85
Span Gas Value	10.00	10.10	310.0	30.0
Calibration				
Pretest Calibration				
Zero%	0.1	0.0	0.8	0.1
Span%	10.0	10.1	311.0	31.1
Post Test Calibration				
Zero%	0.0	0.1	2.6	0.0
Span%	10.0	10.0	311.8	30.6
Results				
Absolute Bias (Zero)	0.0%	0.5%	0.1%	0.0%
Absolute Bias (Span)	0.0%	0.5%	0.4%	0.0%
Absolute Drift (Zero)	0.5%	0.5%	0.1%	0.1%
Absolute Drift (Span)	0.0%	0.5%	0.1%	0.6%

	Corrected O_2 %	Corrected CO_2 %	Corrected CH_4 ppmvw	Corrected NMOC ppm
	20.2	*-0.1*	*187.7*	*16.8*

Run Length (Minutes)	Time	Uncorrected O_2 %	Uncorrected CO_2 %	Uncorrected CH_4 ppmvw	Uncorrected NMOC ppm
		20.1	0.0	189.3	17.3
1	10:41	19.9	0.0	251.6	23.3
2	10:42	19.9	0.0	185.1	17.1
3	10:43	19.9	0.0	164.8	14.3
4	10:44	19.9	0.0	195.6	18.5
5	10:45	19.9	0.0	232.1	20.4
6	10:46	20.0	0.0	256.9	23.6
7	10:47	19.9	0.0	245.2	22.9
8	10:48	19.9	0.0	228.0	21.2
9	10:49	19.9	0.0	236.8	22.2
10	10:50	19.9	0.0	227.5	21.3
11	10:51	20.0	0.0	247.2	23.7
12	10:52	19.9	0.0	221.9	21.3
13	10:53	20.0	0.0	204.3	20.0
14	10:54	19.9	0.0	265.7	25.3
15	10:55	19.9	0.0	229.2	22.8
16	10:56	19.9	0.0	213.0	20.7
17	10:57	20.0	0.0	267.3	24.2
18	10:58	19.9	0.0	202.7	18.6
19	10:59	19.9	0.0	248.6	22.4
20	11:00	20.0	0.0	162.8	15.5
21	11:01	19.9	0.0	149.5	14.7
22	11:02	19.9	0.0	201.0	18.0
23	11:03	19.9	0.0	116.0	10.6
24	11:04	19.9	0.0	194.0	17.6
25	11:05	19.9	0.0	279.6	26.1
26	11:06	20.1	0.0	271.3	24.3
27	11:07	20.2	0.0	203.8	17.9
28	11:08	20.3	0.0	178.4	16.2
29	11:09	20.3	0.0	196.9	17.8
30	11:10	20.3	0.0	148.7	13.4
31	11:11	20.3	0.0	155.3	14.5
32	11:12	20.3	0.0	99.5	7.7
33	11:13	20.3	0.0	50.1	2.4
34	11:14	20.2	0.0	163.9	16.4
35	11:15	20.3	0.0	266.8	25.2
36	11:16	20.3	0.0	232.8	22.0
37	11:17	20.3	0.0	115.6	10.5
38	11:18	20.3	0.0	107.6	10.3
39	11:19	20.3	0.0	161.6	16.0
40	11:20	20.3	0.0	174.6	16.2
41	11:21	20.3	0.0	51.1	2.9
42	11:22	20.3	0.0	65.5	5.0
43	11:23	20.2	0.0	152.5	13.7
44	11:24	20.3	0.0	182.4	17.0
45	11:25	20.2	0.0	210.5	20.2
46	11:26	20.3	0.0	224.7	21.6
47	11:27	20.3	0.0	196.1	18.4
48	11:28	20.2	0.0	221.2	19.6
49	11:29	20.2	0.0	214.7	18.5
50	11:30	20.2	0.0	128.8	10.6
51	11:31	20.3	0.0	144.6	12.7
52	11:32	20.2	0.0	175.3	15.4
53	11:33	20.2	0.0	217.4	19.9
54	11:34	20.2	0.0	342.5	29.8
55	11:35	20.2	0.0	291.3	27.0
56	11:36	20.2	0.0	145.0	13.4
57	11:37	20.2	0.0	171.8	16.0
58	11:38	20.2	0.0	102.1	8.9
59	11:39	20.2	0.0	77.6	5.3
60	11:40	20.2	0.0	87.8	7.3

ETC Canyon Pipeline, LLC
Greasewood Gas Plant
Rio Blanco County, CO
Flare Outlet
10/08/10

Run 3

Start Time	10/8/10 11:59
Run Length	60
Stop Time	12:59

Calibration Information				
Gas	O_2	CO_2	CH_4	NMOC
Instrument Range	21.1	19.7	1500	85
Span Gas Value	10.00	10.10	310.0	30.0
Calibration				
Pretest Calibration				
Zero%	0.0	0.1	2.6	0.0
Span%	10.0	10.0	311.8	30.6
Post Test Calibration				
Zero%	0.1	0.0	1.1	0.5
Span%	10.0	10.0	308.7	30.3
Results				
Absolute Bias (Zero)	0.5%	0.0%	0.0%	0.6%
Absolute Bias (Span)	0.0%	0.5%	0.1%	0.4%
Absolute Drift (Zero)	0.5%	0.5%	0.1%	0.6%
Absolute Drift (Span)	0.0%	0.0%	0.2%	0.4%

	Corrected O_2 %	Corrected CO_2 %	Corrected CH_4 ppmvw	Corrected NMOC ppm
	20.2	*0.0*	*215.3*	*18.9*

Run Length (Minutes)	Time	Uncorrected O_2 %	Uncorrected CO_2 %	Uncorrected CH_4 ppmvw	Uncorrected NMOC ppm
		20.2	0.0	216.0	19.3
1	11:59	20.3	0.0	187.9	16.4
2	12:00	20.2	0.0	231.3	20.8
3	12:01	20.2	0.0	216.3	19.3
4	12:02	20.2	0.0	297.4	25.3
5	12:03	20.2	0.0	312.8	26.5
6	12:04	20.2	0.0	242.1	19.6
7	12:05	20.3	0.0	181.7	15.2
8	12:06	20.2	0.0	207.3	17.1
9	12:07	20.3	0.0	229.3	20.7
10	12:08	20.3	0.0	237.5	21.4
11	12:09	20.3	0.0	231.1	21.0
12	12:10	20.3	0.0	193.6	17.5
13	12:11	20.2	0.0	172.6	14.6
14	12:12	20.3	0.0	225.5	19.6
15	12:13	20.3	0.0	218.7	18.9
16	12:14	20.3	0.0	98.4	8.5
17	12:15	20.2	0.0	244.2	21.2
18	12:16	20.3	0.0	363.1	31.0
19	12:17	20.3	0.0	269.1	23.3
20	12:18	20.3	0.0	154.7	13.0
21	12:19	20.3	0.0	251.3	23.0
22	12:20	20.2	0.0	155.5	14.8
23	12:21	20.3	0.0	60.0	5.1
24	12:22	20.3	0.0	273.2	22.2
25	12:23	20.3	0.0	166.9	15.2
26	12:24	20.2	0.0	222.8	19.0
27	12:25	20.2	0.0	234.7	21.5
28	12:26	20.3	0.0	235.6	21.6
29	12:27	20.2	0.0	235.7	21.5
30	12:28	20.2	0.0	298.2	27.5
31	12:29	20.3	0.0	304.9	26.4
32	12:30	20.2	0.0	244.9	20.2
33	12:31	20.2	0.0	169.2	14.6
34	12:32	20.3	0.0	130.9	12.1
35	12:33	20.3	0.0	147.3	13.5
36	12:34	20.3	0.0	172.1	15.5
37	12:35	20.2	0.0	196.6	17.9
38	12:36	20.3	0.0	165.6	14.6
39	12:37	20.3	0.0	247.6	21.3
40	12:38	20.2	0.0	232.4	21.5
41	12:39	20.2	0.1	237.4	21.4
42	12:40	20.2	0.1	235.6	20.9
43	12:41	20.1	0.1	142.1	11.9
44	12:42	20.1	0.1	250.0	21.3
45	12:43	20.1	0.1	268.9	22.3
46	12:44	20.1	0.1	217.2	19.5
47	12:45	20.1	0.1	237.5	20.6
48	12:46	20.2	0.1	195.9	17.4
49	12:47	20.2	0.1	219.3	20.0
50	12:48	20.1	0.1	197.8	17.7
51	12:49	20.1	0.2	204.2	18.6
52	12:50	20.1	0.2	220.6	21.2
53	12:51	20.0	0.2	220.7	21.8
54	12:52	20.0	0.2	214.5	20.8
55	12:53	20.0	0.2	214.1	20.6
56	12:54	20.1	0.1	218.8	21.0
57	12:55	20.0	0.2	209.2	20.4
58	12:56	20.0	0.2	205.3	19.9
59	12:57	20.1	0.2	204.1	20.0
60	12:58	20.1	0.2	188.9	19.3

Sample Calculations

EPA Methods 1 - 4 : Determination of Stack Gas Velocity and Volumetric Flow Rate
ETC Canyon Pipeline, LLC: Debeque Compressor Station - Flare Outlet, Run #1 (10/04/10)
Sample Calculations

$$\text{sample volume (scf)} = \frac{(17.64)\cdot V_M \cdot Y_D \cdot \left(P_B + \frac{\Delta H}{13.6}\right)}{T_M + 460}$$

$$= \frac{(17.64)\cdot(40.953)\cdot(0.980)\cdot\left[(25.01) + \frac{(1.0)}{13.6}\right]}{[(81) + 460]}$$

$$= 32.799$$

$$\text{moisture volume (scf)} = (0.04707)\cdot V_{LC}$$

$$= (0.04707)\cdot(20.2)$$

$$= 0.95$$

$$\text{moisture content (\%/100)} = \frac{V_{W(STD)}}{\left(V_{M(STD)} + V_{W(STD)}\right)}$$

$$= \frac{(0.95)}{[(32.799) + (0.95)]}$$

$$= 0.028$$

$$\text{molecular weight, dry (grams/mol)} = (0.440)\cdot(\%CO_2) + (0.320)\cdot(\%O_2) + (0.280)\cdot(\%N_2 + \%CO)$$

$$= (0.440)\cdot(0.2) + (0.320)\cdot(20.5) + (0.280)\cdot[(79.4) + (0.0)]$$

$$= 28.84$$

$$\text{molecular weight, actual (grams/mol)} = M_D\cdot(1 - B_{WS}) + (18.0)\cdot B_{WS}$$

$$= (28.84)\cdot[1 - (0.028)] + (18.0)\cdot(0.028)$$

$$= 28.84$$

$$\text{gas velocity (ft/sec)} = (85.49)\cdot C_P \cdot \sqrt{\Delta P}_{AVG} \cdot \sqrt{\frac{T_S + 460}{\left[P_B + \frac{P_S}{(13.6)}\right]\cdot M_A}}$$

$$= (85.49)\cdot(0.82)\cdot(0.1060)\cdot \sqrt{\frac{(432) + 460}{\left[(25.01) + \frac{(0.0)}{(13.6)}\right]\cdot(28.54)}}$$

$$= 8.3$$

EPA Methods 1 - 4 : Determination of Stack Gas Velocity and Volumetric Flow Rate
ETC Canyon Pipeline, LLC: Debeque Compressor Station - Flare Outlet, Run #1 (10/04/10)
Sample Calculations (continued)

$$\text{gas flow (acfm)} = (60)\cdot\frac{\pi\cdot\left(\frac{D_S}{12}\right)^2}{4}\cdot V_S$$

$$= (60)\cdot\frac{\pi\cdot\left[\frac{(36.5)}{12}\right]^2}{4}\cdot(8.3)$$

$$= 3{,}622$$

$$\text{gas flow (dscfm)} = (60)\cdot V_S\cdot(1-B_{WS})\cdot\frac{\pi\cdot\left(\frac{D_S}{12}\right)^2}{4}\cdot\frac{T_{STD}\cdot\left[P_B+\frac{P_S}{(13.6)}\right]}{(T_S+460)\cdot P_{STD}}$$

$$= (60)\cdot(8.3)\cdot(1-0.028)\cdot\frac{\pi\cdot\left[\frac{(36.5)}{12}\right]^2}{4}\cdot\frac{(528)\cdot\left[(25.01)+\frac{(0.0)}{(13.6)}\right]}{[(432)+460]\cdot(29.92)}$$

$$= 1{,}741$$

Variables and Abbreviations

B_{WS} - moisture content of the gas (wet volume percent/100)

%CO - carbon monoxide content of the gas (dry volume percent)

$\%CO_2$ - carbon dioxide content of the gas (dry volume percent)

C_P - pitot tube constant (unitless)

D_S - diameter of the stack (inches)

ΔH - pressure differential at dry gas meter exit orifice (inches water)

M_D - molecular weight of the dry gas (grams per mol)

M_A - molecular weight of the wet gas (grams per mol)

$\%N_2$ - *nitrogen content of the gas (dry volume percent)*

$\%O_2$ - oxygen content of the gas (dry volume percent)

$\sqrt{\Delta P_{AVG}}$ - average square root of the stack gas pitot differential pressure (inches water)

P_B - barometric pressure (inches mercury)

EPA Methods 1 - 4 : Determination of Stack Gas Velocity and Volumetric Flow Rate
ETC Canyon Pipeline, LLC: Debeque Compressor Station - Flare Outlet, Run #1 (10/04/10)
Variables and Abbreviations (continued)

P_S - stack pressure relative to barometric presure (inches water)

P_{STD} - standard pressure (29.92 inches mercury)

T_M - average dry gas meter temperature (°F)

T_S - average stack temperature (°F)

T_{STD} - standard temperature (528 °R)

V_{LC} - volume of moisture collected as a liquid (milliliters)

V_M - volume indicated on dry gas meter (uncorrected actual cubic feet)

V_{MSTD} - volume of gas through dry gas meter (corrected dry standard cubic feet)

V_S - stack gas velocity (feet per second)

V_{WSTD} - volume of moisture collected as a gas at standard conditions (standard cubic feet)

Y_D - dry gas meter calibration factor (unitless)

EPA Method 3A - Determination of O_2 / CO_2 Concentrations in Emissions from Stationary Sources
ETC Canyon Pipeline, LLC: Debeque Compressor Station - Flare Outlet, Run #1 (10/04/10)
Sample Calculations

$$CO_2 \text{ conc, drift cal (\%vd)} = \frac{(\%FS_{STACK} - \%FS_0)[Span\ Gas\ Conc\ (\%vd)]}{(\%FS_{SPAN} - \%FS_0)}$$

$$= \frac{[(0.2) - (0.0)](10.1)}{[(10.1) - (0.0)]}$$

$$= 0.2$$

$$O_2 \text{ conc, drift cal (\%vd)} = \frac{(\%FS_{STACK} - \%FS_0)[Span\ Gas\ Conc\ (\%vd)]}{(\%FS_{SPAN} - \%FS_0)}$$

$$= \frac{[(20.6) - (0.0)](10.0)}{[(10.05) - (0.0)]}$$

$$= 20.5$$

Variables and Abbreviations

cal - calibrated

conc - concentration

CO_2 - Carbon Dioxide

O_2 - Oxygen

$\%FS_{SPAN}$ - average analyzer reading for span gas (percent of full scale)

$\%FS_{STACK}$ - average analyzer reading for stack gas (percent of full scale)

$\%FS_0$ - average analyzer reading for zero gas (percent of full scale)

%vd- dry volume percent

EPA Method 25A - Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer
ETC Canyon Pipeline, LLC: Debeque Compressor Station - Flare Outlet, Run #1 (10/04/10)
Sample Calculations

$$\text{NMOC conc, drift cal (ppmvw as } C_3H_8) = \frac{(\%FS_{STACK} - \%FS_0)[\text{Span Gas Conc (ppmvd)}]}{(\%FS_{SPAN} - \%FS_0)}$$

$$= \frac{[(11.8) - (0.3)](30.0)}{[(31.65) - (0.3)]}$$

$$= 11.0$$

$$\text{NMOC emissions (ppmvd as } C_3H_8) = \frac{[\text{NMOC conc, drift cal (ppmvw)}]}{(1 - B_{WS})}$$

$$= \frac{(11.0)}{(1 \ 0.028)}$$

$$= 11.3$$

$$\text{NMOC emissions (lb/hr as } C_3H_8) = \frac{\text{NMOC (ppmvw as } C_3H_8)}{(1 - B_{ws})} \cdot F_{dscfm} \cdot (6.866 \cdot 10^{-6})$$

$$= \frac{11.0}{(1 - 0.028)} \cdot (1{,}741) \cdot (6.862 \cdot 10^{-6})$$

$$= 0.1$$

$$\text{NMOC emissions (tn/yr as } C_3H_8) = [\text{NMOC emissions (lb/hr as } C_3H_8)] \left[\frac{8{,}760 \text{ (hrs/yr)}}{2{,}000 \text{ (lb/tn)}}\right]$$

$$= (0.1) \cdot (4.38)$$

$$= 0.6$$

$$\text{NMOC emissions (lb/year as } C_3H_8) = \text{NMOC (tn/year as } C_3H_8) \cdot \frac{2000 \text{ lbs}}{1 \text{ ton}}$$

$$= 0.6 \cdot (2{,}000)$$

$$= 1{,}181$$

$$\text{DRE (\%)} = \frac{\text{Inlet NMOC (lb/hr)} - \text{Outlet NMOC (lb/hr as } C_3H_8)}{\text{Inlet NMOC (lb/hr)}}$$

$$= \frac{(22.0) - (0.13)}{(22.0)}$$

$$= 99.4\%$$

Variables and Abbreviations

as C_3H_8 - as propane or C_3

B_{WS} - *moisture content of the gas (wet volume percent/100)*

cal - calibrated

conc - concentration

EPA Method 25A - Determination of Total Gaseous Organic Concentration Using a Flame Ionization Analyzer
ETC Canyon Pipeline, LLC: Debeque Compressor Station - Flare Outlet, Run #1 (10/04/10)
Variables and Abbreviations (continued)

F_{DSCFM} - gas flow (dry standard cubic feet per minute, where standard = 29.92 inches Hg and 68°F)

$\%FS_{SPAN}$ - average analyzer reading for span gas at probe tip (percent of full scale)

$\%FS_{STACK}$ - average analyzer reading for stack gas (percent of full scale)

$\%FS_{0}$ - average analyzer reading for zero gas at probe tip (percent of full scale)

lb/hr - pounds per hour

ppmvw - parts per million, wet volume basis

DRE% - destruction removal efficiency

Appendix 2

Field and Operating Data

Debeque Compressor Station Flare

Air Pollution Testing, Inc. : Analyzer Calibration Datasheet

Facility : Debeque Compressor station	Date : 10-4-10
Location : Debeque CO	APT Job # : ETC0305
Unit : Flare	Page # :

Analyzer Information

Analyzer Type	O2	CO2	CH4	NM		
Analyzer ID #	1420C-7	1415C-9	55 1'	55 1		
Analyzer Scale	0-25	0-~~197~~20	0-5000	0-5000		
Calibration Range	0-21.1	0-14.7	0-1500	0-84.5		

Calibration Gas Cylinder Information (Cylinder ID#/Expiration date and Concentration)

Analyzer Type	O2	CO2	CH4	NM.		
Zero	Nox 31.7	0	0	0		
CC#	ALM032664					
Expiration date	11-11					
Low			310 ✓	30.0 ✓		
CC#			AAL 19994	ALM052218		
Expiration date			6-13	4-13		
Mid	10.0 ✓	10.1 ✓	759 ✓	50.1 ✓		
CC#	ALM017884	→	ALM061294	CC131241		
Expiration date	6-13	→	6-13	11-11		
High	21.1 ✓	19.7 ✓	1500 ✓	84.5 ✓		
CC#	ALM000245	→	ALM03634	CC109539		
Expiration date	4-13	→	6-13			

Calibration Error

Analyzer Type	O2	CO2	CH4	NM		
Zero	0.0	0.0	0.5	0.0		
Low			311.4	30.2		
Mid	10.1	10.1	766.5	50.9		
High	21.1	19.7	1500.6	84.9		

Initial Bias Check

Analyzer Type	O2	CO2	CH4	NM		
Zero	0.0	6.0	0.5	-0.4		
Low						
Mid	10.1	10.1	310	31.2		
High						

Air Pollution Testing, Inc. : Analyzer Calibration Data Sheet

Facility : Debeque Compressor Station — Date : 10-4-10

Location : Debeque Co — APT Job # : ETL0305

Unit : Flare — Page # :

Run # : 1 — Start Time : 1448 — Stop Time : 1549

Calibration Results

Analyzer Type	O2	CO2	CH4	NM		
Zero	0.0	0.0	1.1	1.0		
Low						
Mid	10.0	10.1	337.2	32.1		
High						

Run # : 2 — Start Time : 1613 — Stop Time : 1713

Calibration Results

Analyzer Type	O2	CO2	CH4	NM		
Zero	0.0	0.0	1.4	0		
Low						
Mid	10.0	10.1	335.2	30.5		
High						

Run # : 3 — Start Time : 1731 — Stop Time : 1831

Calibration Results

Analyzer Type	O2	CO2	CH4	NM		
Zero	0.0	0.0	2.0	0.9		
Low						
Mid	10.0	10.1	329.2	30.4		
High						

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # : ETC0305
Facility : Debeque, CO
Date : 10-4-10
Probe ID : P-448
Pitot Constant : .84 .821
Operator : Brendan Cohen
Site :
Points : 1 1.2 | 2 3.8 | 3 7.1 | 4 11.8 | 5 29.7 | 6 29.9 | 7 32.7 | 8 35.3 | 9 | 10 | 11

Stack Diameter (inches) : 36.5"
Upstream Disturbance (inches) : 7"
Downstream Disturbance (inches) : 36"
Schematic of Sampling Location :

Run 1-1 outlet

O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : .008 Pb ("Hg) : CDAS
Start Time : 1530 Stop Time : 1538
Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1	0.01	433	
1	0.01	434	
3	0.007	435	
4	0.007	435	
5	0.012	434	
6	0.02	434	
~~7~~			
~~8~~			
~~9~~			
2-1	.006	433	
2	.007	434	
3	.006	434	
4	.008	435	
5	.012	435	
6	.02	434	
7	.021	433	
8	.020	433	
	1.484	214	
Averages :	0.106	433	

Run 1-2 outlet

O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : 4001 Pb ("Hg) : CDAS
Start Time : 1535 Stop Time : 1540
Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.002	431	
2	.008	432	
3	.008	433	
4	.01	433	
5	.012	432	
6	.012	432	
7	.015	431	
8	.02	431	
2-1	.007	431	
2	.008	432	
3	.009	433	
4	.012	433	
5	.015	432	
6	.02	432	
7	.02	432	
8	.022	432	
	1.732	216	
	Slow pump	1400	
Averages :	0.108	432	

Run 1-3 outlet

O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : 1001 Pb ("Hg) : CDAS
Start Time : 1542 Stop Time : 1549
Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.007	430	
2	.009	430	
3	.007	430	
4	0.008	431	
5	0.012	431	
6	.01	430	
7	0.014	430	
8	.01	429	
2-1	.006	429	
2	.007	429	
3	.007	430	
4	.011	430	
5	.013	43	
6	.02	430	
7	.02	430	
8	.021	430	
	~~1.8~~		
	1.671		
Averages :	0.104	430	

Reviewers Signature :

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # :	ETC 0305	Operator :	Brenton Cohen
Facility :	Debeque, CO	Site :	
Date :	10-4-10		
Probe ID :	P-498		
Pitot Constant :	STD .821		

Points : 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Stack Diameter (inches) : 36.5"
Upstream Disturbance (inches) : 7"
Downstream Disturbance (inches) : 36"
Schematic of Sampling Location :

Run # : 2-1 outlet

O2% : COAS CO2% : COAS
H20% : COAS measured / estimate
Ps ("H2O) : .001 Pb ("Hg) : COAS
Start Time : 1615 Stop Time : 1623
Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.005	422	
2	.007	423	
3	.007	423	
4	.009	422	
5	.01	421	
6	.012	421	
7	.02	422	
8	.025	422	
2-1	.005	422	
2	.008	423	
3	.01	423	
4	.015	422	
5	.01	422	
6	.015	421	
7	.007	421	
8	.007	422	
Averages :	0.101	422	

Run # : 2-2 outlet

O2% : COAS CO2% : COAS
H20% : COAS measured / estimate
Ps ("H2O) : .001 Pb ("Hg) : COAS
Start Time : 1625 Stop Time : 1630
Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.006	424	
2	.007	425	
3	.01	425	
4	.01	425	
5	.015	425	
6	.015	424	
7	.010	424	
8	.012	423	
2-1	.01	423	
2	.005	424	
3	.005	423	
4	.007	423	
5	.007	424	
6	.007	424	
7	.01	425	
8	.015	423	
Averages :	0.096	424	

Run # : 2-3 outlet

O2% : COAS CO2% : COAS
H20% : COAS measured / estimate
Ps ("H2O) : .001 Pb ("Hg) : COAS
Start Time : 1632 Stop Time : 1638
Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.007	411	
2	.007	412	
3	.01	412	
4	.015	412	
5	.01	413	
6	.015	413	
7	.02	412	
8	.02	411	
2-1	.007	411	
2	.005	411	
3	.005	412	
4	.007	412	
5	.01	413	
6	.01	413	
7	.016	412	
8	.022	412	
Averages :	0.089	412	

Reviewers Signature :

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job #: ETC-0305 | Operator: Brenda Cohen
Facility: Debeque, CO | Site:
Date: 10-4-10
Probe ID: P-498
Pitot Constant: STD .821 ✓

Points: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12 (12 circled)

Stack Diameter (inches): 36.5"
Upstream Disturbance (inches): 7"
Downstream Disturbance (inches): 36"
Schematic of Sampling Location:

Run #: 3-Toilet

O2%: CDS | CO2%: CDS
H2O%: CDS | measured / estimate
Ps ("H2O): CDS | Pb ("Hg): CDS
Start Time: 1750 | Stop Time: 1759
Post Test Pitot Leak Check Good? ✓

Point #	Delta P	Ts	Notes
1-1	.005	410	
2	.007	411	
3	.007	411	
4	.005	411	
5	.007	410	
6	.01	410	
7	.015	404	
8	.022	404	
2-1	.005	409	
2	.005	410	
3	.005	410	
4	.007	409	
5	.015	409	
6	.015	411	
7	.015	411	
8	.022	410	
	.0978		
Averages:	~~.1392~~	410	

.1089

Run #: 3-2 outlet

O2%: CDS | CO2%: CDS
H2O%: CDS | measured / estimate
Ps ("H2O): CDS 0.001 | Pb ("Hg): CDS
Start Time: 1803 | Stop Time: 1814
Post Test Pitot Leak Check Good? ✓

Point #	Delta P	Ts	Notes
1-1	.005	406	
2	.005	405	
3	.005	405	
4	.007	406	
5	.01	407	
6	.015	407	
7	.020	406	
8	.025	406	
2-1	.007	407	
2	.005	407	
3	.007	406	
4	.005	405	
5	.015	405	
6	.015	406	
7	.02	405	
8	.025	407	
	.1044		
Averages:	.1000	406	

Run #: 3-3 outlet

O2%: CDS | CO2%: CDS
H2O%: CDS | measured / estimate
Ps ("H2O): 0.001 | Pb ("Hg): CDS
Start Time: 1816 | Stop Time: 1824
Post Test Pitot Leak Check Good? ✓

Point #	Delta P	Ts	Notes
1-1	.005	400	
2	.005	400	
3	.007	400	
4	.01	400	
5	.015	400	
6	.015	400	
7	.02	400	
8	.025	400	
2-1	.0025	400	
2	.005	400	
3	.007	400	
4	.01	400	
5	.015	400	
6	.015	400	
7	.02	400	
8	.025	400	
	.1087		
Averages:		400	

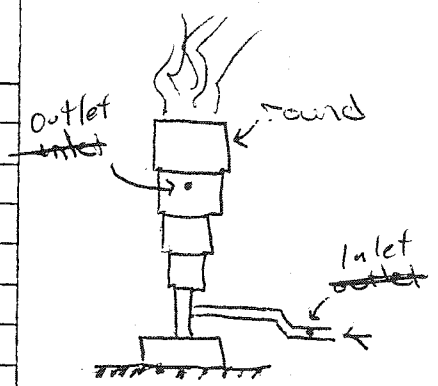
Reviewers Signature:

Air Pollution Testing, Inc. : EPA Method 4 - Moisture Determination Datasheet

Job No.: IETC 0305	Date: 10-4-10	CO2 (%): COAS	O2 (%): COAS
Location: Pebeque	Operator: Brenda Cohen	Ambient Temperature (oF): 75	Barometric Pressure (mm):
Run #: 1 (outlet)	Meter Box ID: MS-10	Probe Length (ft): 2A	Moisture (grams): 20.2
Meter Box #: 980	Meter DH@: 1.71	Static Pressure (" H2O):	Start Time: 14:49
Pre-Test Pump Leak Check: 0.00@10"hg	Post-Test Pump Leak Check: 0.00@10"hg	Method: 4	Stop Time: 15:49

Sampling Time (minutes)	Vacuum (" Hg)	Orifice Setting (" H2O)	Meter Temp. Inlet (oF)	Meter Temp. Outlet (oF)	Condenser Temp (oF)	Meter Volume (ft3) Initial Volume	Notes
						574.152	
5	0	1.0	78	84	35	577.55	
10	0	1.0	78	84	36	580.90	
15	0	1.0	78	84	37	584.20	
20	0	1.0	78	84	38	587.955	
25	0	1.0	78	84	39	591.371	
30	0	1.0	79	87	39	594.851	
35	0	1.0	79	84	40	598.25	
40	0	1.0	79	84	40	601.63	
45	0	1.0	79	84	40	604.98	
50	0	1.0	79	84	41	608.35	
55	0	1.0	79	84	41	611.72	
60	0	1.0	80	84	41	615.105	
		—	1955				
low	maximum	average	average	maximum	difference		
60	0	1.0	81.46	41	40.953		

Schematic of Stack



Stack ID (inches): 365"

Upstream Disturbance (inches):

Downstream Disturbance (Inches):

Moisture Determination

Imp. #	Tare	Final	Gain
1	~~194.5~~ 388.5	389.6	1.1
2	436.3	440.0	3.7
3	304.2	308.0	3.8
4	494.5	506.1	11.6
		Total	20.2

Performer's Signature

Air Pollution Testing, Inc. : EPA Method 4 - Moisture Determination Datasheet

APT Job #: ETC0305 | Date: 10-9-10 | CO2 (%): CDAS | O2 (%): CDAS

Location: Debeque, CO | Operator: Brendan Cohen | Ambient Temperature (oF): | Barometric Pressure (mHg):

Run #: 2 (outlet) | Meter Box ID: MS-10 | Probe Length (ft): 20+ | Moisture (grams): 9.9

Meter Box #: .980 ✓ | Meter DH@: 1.71 ✓ | Static Pressure (" H2O): | Start Time: 1613

Pre-Test Pump Leak Check: 0.0 @ 10" hg | Post-Test Pump Leak Check: 0.005" hg | Method: 4 | Stop Time: 1713

Sampling Time (minutes)	Vacuum (" Hg)	Orifice Setting (" H2O)	Meter Temp. Inlet (oF)	Meter Temp. Outlet (oF)	Condenser Temp (oF)	Meter Volume (ft3): Initial Volume	Notes
						615.165	
5	0	1.0	79	80	36	618.472	
10	0	1.0	78	79	37	621.801	
15	0	1.0	78	79	38	625.22	
20	0	1.0	78	79	39	628.89	
25	0	1.0	78	79	40	632.375	
30	0	1.0	78	79	40	635.821	
35	0	1.0	77	79	40	639.301	
40	0	1.0	77	79	40	642.712	
45	0	1.0	75	79	39	646.102	
50	0	1.0	75	79	39	649.432	
55	0	1.0	75	79	39	652.981	
60	0	1.0	75	79	39	656.512	
			1572		3906		
total	maximum	average	average	maximum	difference		
60	0	1.0	(78)	38.8	~~A9.65~~		
					(41.347)		

Schematic of Stack:

Stack ID (inches): 36.5

Upstream Disturbance (inches):

Downstream Disturbance (Inches):

Moisture Determination

Imp. #	Tare	Final	Gain
1	388.7	389.5	0.8
2	438.0	439.1	1.1
3	306.2	308.5	2.3
4	504.3	509.5	5.2
		Total	(9.4)

Reviewer's Signature:

Air Pollution Testing, Inc. : EPA Method 4 - Moisture Determination Datasheet

Job No.: ETC 0305 | Date: 10-4-10 | CO2 (%): CDAS | O2 (%): CDAS

Location: Debeque, CO | Operator: Brendan Cohen | Ambient Temperature (oF): | Barometric Pressure (mbar):

Run #: 3 (outlet) | Meter Box ID: M5-14 | Probe Length (ft): 2ft | Moisture (grams): 13.1

Meter Box Cal: .980 | Meter DH@: 1.71 | Static Pressure (" H2O): | Start Time: 1731

Pre-Test Pump Leak Check: 0.005" hg | Post-Test Pump Leak Check: 0.006" hg | Method: 4 | Stop Time: 1831

Sampling Time (minutes)	Vacuum (" Hg)	Orifice Setting (" H2O)	Meter Temp Inlet (oF)	Meter Temp Outlet (oF)	Condenser Temp (oF)	Meter Volume (ft3): Initial Volume	Notes
						656.531	
5	1	1.0	81	82	40	659.936	
10	1	1.0	81	82	40	663.341	
15	1	1.0	81	82	40	666.782	
20	1	1.0	81	82	40	669.999	
25	1	1.0	81	82	40	674.621	
30	1	1.0	81	82	40	678.108	
35	1	1.0	81	82	40	681.551	
40	1	1.0	81	82	40	684.201	
45	1	1.0	81	82	41	687.652	
50	1	1.0	80	81	41	691.104	
55	1	1.0	80	81	41	694.500	
60	1	1.0	78	80	42	697.928	
Total	Maximum	Average	Average	Maximum	Difference		
60	1	1.0	81.125	40.4	41.397		

Schematic of Stack

Stack ID (inches): 36.5

Upstream Disturbance (inches):

Downstream Disturbance (Inches):

Moisture Determination

Imp. #	Tare	Final	Gain
1	389.5	394.7	5.2
2	437.1	439.7	2.6
3	308.5	310.5	2.0
4	509.5	512.8	3.3
		Total	13.1

Reviewer's Signature:

Air Pollution Testing Inc. : EPA Method 2 - Pilot Traverse Datasheet

Job # : ETC 0305 | Operator : Brendan Cohen
Facility : Debeque, CO | Site :
Date : 10-4-90
Probe ID : P-498
Pilot Constant : .841 .821

Points : 1 2 3 4 5 6 7 8 9 10 11 (12)

Stack Diameter (inches) : 4
Upstream Disturbance (inches) : ~~7 FT~~
Downstream Disturbance (inches) : ~~3 FT~~
Schematic of Sampling Location :

Run # : 1-1 inlet

O2% : CDAS | CO2% : CDAS
H20% : CDAS | measured / estimate
Ps ("H2O) : CDAS | Pb ("Hg) : CDAS
Start Time : 1455 | Stop Time : 1608
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1	.005	95	
2	.004	95	
3	.005	95	
4	.005	95	
5	.004	95	
6	.005	95	
~~1~~			
~~2~~			
~~3~~			
~~4~~			
~~5~~			
~~6~~			
2-1			
2			
3			
4			
5			
6			
~~1~~			
~~2~~			
Averages :	.064	95	

Run # : 1-2 inlet

O2% : CDAS | CO2% : CDAS
H20% : CDAS | measured / estimate
Ps ("H2O) : CDAS 0.000 | Pb ("Hg) : CDAS
Start Time : 1509 | Stop Time : 1519
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1	.007	98	
2	.007	98	
3	.004	98	
4	.004	98	
5	.005	98	
6	.005	98	
Averages :	0.073	98	

Run # : 1-3 inlet

O2% : CDAS | CO2% : CDAS
H20% : CDAS | measured / estimate
Ps ("H2O) : CDAS | Pb ("Hg) : CDAS
Start Time : 1522 | Stop Time : 1525
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
~~.007~~ 1	.007	96	
~~.005~~ 2	.007	96	
~~.007~~ 3	.007	96	
~~.007~~ 4	.007	96	
~~.005~~ 5	.005	96	
~~.004~~ 6	.004	96	
Averages :	~~.076~~ .070	96	

Reviewers Signature :

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # :	FTC 0305	Operator :	Brenda Cohen
Facility :	Dehegue, CO	Site :	
Date :	10-2-10		
Probe ID :	P-498		
Pilot Constant :	~~.811~~ .821		

Points : 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, (12)

Stack Diameter (inches) : 4
Upstream Disturbance (inches) : ~~7~~ 11
Downstream Disturbance (inches) : ~~36~~

Schematic of Sampling Location :

Run # : 2-1 inlet

O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : .000 Pb ("Hg) : CDAS
Start Time : 1640 Stop Time : 1645
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1	.003	95	
2	.003	95	
3	.005	95	
4	.005	95	
5	.003	95	
6	.003	93	
Averages :	~~.064~~ .068	95	

~~.06409~~

Run # : 2-2 inlet

O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : .000 Pb ("Hg) : CDAS
Start Time : 1647 Stop Time : 1651
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1	.003	94	
2	.004	94	
3	.005	94	
4	.003	94	
5	.005	94	
6	.004	94	
Averages :	.0629	94	

Run # : 2-3 inlet

O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : .000 Pb ("Hg) :
Start Time : 1653 Stop Time : 1656
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1	.003	93	
2	.002	93	
3	.005	93	
4	.005	93	
5	.003	93	
6	.005	93	
Averages :	.0617	93	

Reviewers Signature :

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # : ETC0305 | Operator : Brendan Cohen

Facility : Debeque, CO | Site :

Date : 10-4-10

Probe ID : P-448

Pitot Constant : ~~.84~~ .821 ✓

Points : 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, (12)

Stack Diameter (inches) : 4

Upstream Disturbance (inches) : 7+

Downstream Disturbance (inches) : 36+

Schematic of Sampling Location :

Run # : 3-1 inlet

O2% : CDH | CO2% : CDH

H20% : CDH | measured / estimate

Ps ("H2O) : 1.000 | Pb ("Hg) : CDH

Start Time : 17:32 | Stop Time : 17:36

Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	~~.002~~ .002	95	
2	~~.004~~ .005	95	
3	.003	95	
4	.005	95	
5	.007	95	
6	.005	95	
Averages :	0.069	95	

Run # : 3-2 inlet

O2% : CDH | CO2% : CDH

H20% : CDH | measured / estimate

Ps ("H2O) : 1.000 | Pb ("Hg) : CDH

Start Time : 1738 | Stop Time : 1742

Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.002	90	
2	.005	90	
3	.005	90	
4	.002	90	
5	.005	90	
6	.005	90	
Averages :	0.062	90	

Run # : 3-3 inlet

O2% : CDH | CO2% : CDH

H20% : CDH | measured / estimate

Ps ("H2O) : 0.000 | Pb ("Hg) : CDH

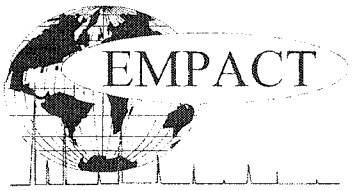
Start Time : 1744 | Stop Time : 1748

Post Test Pitot Leak Check Good? :

Point #	Delta P	Ts	Notes
1-1	.007	95	
2	.005	95	
3	.005	95	
4	.007	95	
5	.005	95	
6	.002	95	
Averages :	0.071	95	

Reviewers Signature :

Inlet Gas Analysis



NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**01**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 18, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 4, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	615
NAME/DESCRIP :	ETC 0305.DCS.1A; 25A/18 @ 15:30		

FIELD DATA

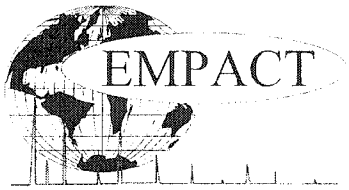
SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.03	-	-
HYDROGEN	0.02	-	-
OXYGEN/ARGON	0.19	-	-
NITROGEN	1.56	-	-
CO2	3.72	-	-
METHANE	81.79	-	-
ETHANE	3.70	0.984	0.989
PROPANE	1.71	0.468	0.471
ISOBUTANE	0.44	0.143	0.144
N-BUTANE	0.69	0.216	0.217
ISOPENTANE	0.49	0.178	0.179
N-PENTANE	0.41	0.148	0.149
HEXANES+	5.25	2.265	2.278
TOTAL	100.00	4.402	4.427

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1278.5	1285.4
GROSS SATURATED REAL =	1256.1	1263.1

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	0.8082
COMPRESSIBILITY FACTOR :	0.99558

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS



NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**02**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 18, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 4, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	607
NAME/DESCRIP :	ETC 0305.DCS.1B; M25A/18		

FIELD DATA

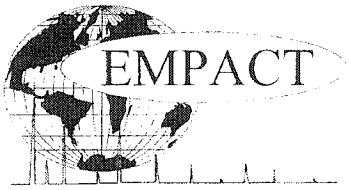
SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.02	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	0.55	-	-
NITROGEN	2.27	-	-
CO2	4.10	-	-
METHANE	79.70	-	-
ETHANE	3.70	0.984	0.989
PROPANE	1.80	0.493	0.496
ISOBUTANE	0.48	0.156	0.157
N-BUTANE	0.76	0.238	0.240
ISOPENTANE	0.56	0.204	0.205
N-PENTANE	0.48	0.173	0.174
HEXANES+	5.58	2.408	2.421
TOTAL	100.00	4.656	4.682

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1285.9	1292.9
GROSS SATURATED REAL =	1263.4	1270.4

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	0.8316
COMPRESSIBILITY FACTOR :	0.99540

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS



NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**03**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 18, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 4, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	664
NAME/DESCRIP :	ETC 0305.DCS.2A; 25A/18		

FIELD DATA

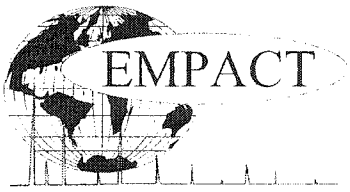
SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.03	-	-
HYDROGEN	0.03	-	-
OXYGEN/ARGON	0.47	-	-
NITROGEN	2.78	-	-
CO2	3.94	-	-
METHANE	81.44	-	-
ETHANE	3.41	0.907	0.912
PROPANE	1.48	0.405	0.408
ISOBUTANE	0.41	0.133	0.134
N-BUTANE	0.63	0.197	0.199
ISOPENTANE	0.40	0.145	0.146
N-PENTANE	0.33	0.119	0.120
HEXANES+	4.65	2.006	2.017
TOTAL	100.00	3.912	3.936

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1223.0	1229.7
GROSS SATURATED REAL =	1201.6	1208.3

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	0.7925
COMPRESSIBILITY FACTOR :	0.99594

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS



NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**04**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 18, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 4, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	338
NAME/DESCRIP :	ETC 0305 DCS.2B; 25A/18		

FIELD DATA

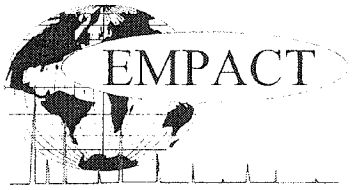
SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.03	-	-
HYDROGEN	0.03	-	-
OXYGEN/ARGON	0.72	-	-
NITROGEN	4.32	-	-
CO2	4.24	-	-
METHANE	79.94	-	-
ETHANE	3.31	0.880	0.885
PROPANE	1.42	0.389	0.391
ISOBUTANE	0.40	0.130	0.131
N-BUTANE	0.63	0.197	0.199
ISOPENTANE	0.41	0.149	0.150
N-PENTANE	0.34	0.123	0.123
HEXANES+	4.21	1.816	1.826
TOTAL	100.00	3.684	3.705

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1182.2	1188.6
GROSS SATURATED REAL =	1161.5	1167.9

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	0.7905
COMPRESSIBILITY FACTOR :	0.99616

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS



NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**05**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 18, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 4, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	750
NAME/DESCRIP :	ETC 0305.DCS.3A; M25A/18		

FIELD DATA

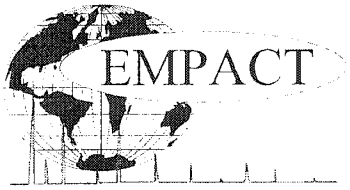
SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.03	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	0.37	-	-
NITROGEN	2.74	-	-
CO2	4.03	-	-
METHANE	82.67	-	-
ETHANE	3.46	0.920	0.925
PROPANE	1.47	0.403	0.405
ISOBUTANE	0.39	0.127	0.128
N-BUTANE	0.60	0.188	0.189
ISOPENTANE	0.43	0.156	0.157
N-PENTANE	0.35	0.126	0.127
HEXANES+	3.46	1.493	1.501
TOTAL	100.00	3.413	3.432

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1174.8	1181.2
GROSS SATURATED REAL =	1154.2	1160.7

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	0.7610
COMPRESSIBILITY FACTOR :	0.99635

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS



NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**06**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 18, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 4, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	1075
NAME/DESCRIP :	ETC 0305.DCS.3B; 25A/18		

FIELD DATA

SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.03	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	0.50	-	-
NITROGEN	2.21	-	-
CO2	4.03	-	-
METHANE	83.14	-	-
ETHANE	3.49	0.928	0.933
PROPANE	1.52	0.416	0.419
ISOBUTANE	0.40	0.130	0.131
N-BUTANE	0.63	0.197	0.199
ISOPENTANE	0.44	0.160	0.161
N-PENTANE	0.36	0.130	0.130
HEXANES+	3.25	1.402	1.410
TOTAL	100.00	3.363	3.383

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1172.6	1179.0
GROSS SATURATED REAL =	1152.1	1158.5

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	0.7555
COMPRESSIBILITY FACTOR :	0.99639

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS

Operating Data

10'5"

ETC Canyon Pipeline, LLC

DAILY READINGS
DeBeque Compressor Station

AMINE UNIT For Month Of: OCTOBER, 2010

DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Time / Initials	CB	CB/1040	CB/1030	CB											
Hours On	24	24	24	24											
Water Tank Level	1/2-	1/4	FULL	FULL											
Amine Tank Level	1/2	1/2	1/2	1/2											
Contact Tower Temperature	100°	102°	100°	108											
Contact Tower Level	0	0	0	0											
Fuel PSI	42/18	44/18	46/18	44/18											
Boost Pump PSI	15	15	15	15											
Amine In Temp EXCH	100°	100°	100°	110°											
Amine Out Temp EXCH	157°	150°	150°	154°											
Surge Tank Level	20	10	17	21											
Flash Tank Temperature	100°	100°	98°	108											
Flash Tank PSI	170	170	170	170											
Flash Tank Level	1/2	1/2	1/2	1/2											
Regen Tower Temp	225°	230°	230°	230°											
Reflux Level	0	1/2-	1/2-	1/2-											
Reflux Temperature	84	100	94°	108°											
Reflux PSI	28	23	25	25											
Carbon Filter Diff	B/P	B/P	B/P	B/P											
Sock Filter Diff	B/P	B/P	B/P	B/P											
Reboiler PSI	20	20	20	20											
Reboiler Temperature	245°	245°	244°	245°											
Reboiler Level	FULL	FULL	FULL	FULL											
Solution Pump In Temp	96	98	97	98											
Amine Concentration	23.66	26.39	24.57	22.75											
CO2 In															
CO2 Out															
Fuel Use	37049	37097	37149	37210											
GPM	33.70	34.79	35.91	36.59											
Comments:															

ENERGY TRANSFER

ETC Canyon Pipeline, LLC

DAILY RE...INGS
PREMIER DEBEQUE

For Month Of: OCTOBER, 2010

DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Time / Initials	06/	06/006	06/000	06/930											
Y'Day Volume 3480	3568	3272	3276												
Hours on Generator	0	0	0	0											
Hours on Amine	24	24	24	24											
Hours on Chiller	24	24	24	24											
Hours on Old Chiller	0	0	0	0											
Hours on G3516	24	24	24	24											
NGL Gallons Made	3/3600	6/720	7/840	6/700											
Product Storage Percent 68%	71%	13%/19%	26%	32%											
Product Storage PSI	35	35	30	33											
Generator Oil Tank	3/4	3/4	3/4	3/4											
Generator Water Temp															
Generator Oil PSI															
Generator Total HRS	13346	13346	13346	13346											
Generator PM HRS	1760	1760	1760	1760											
Pre Cat Temperature															
Post Cat Temperature															
O2 M/V															
Cat Diff															
EG Reboiler Level	22	22	22	22											
EG Reboiler Temperature	244°	244°	246°	248°											
EG Tank	1/2-	1/2-	1/2-	1/2-											
Propane Nurse Tank	75%	75%	75%	75%											
Source CO2	1,97	1,17	1,53	1,42											
Source Moisture	,44	,55	,23	,70											
PREMIER	109	96	94	95											
BRONCO	106	93	92	94											
MESA COUNTY III	109	95	95	96											
DISCHARGE	980	809	983	978											
Comments:															

DAIL. ..EADINGS

DeBeque Compressor Station

ETC Canyon Pipeline, LLC. Unit: Cat 3516 For Month Of: OCTOBER, 201Ø

DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ENGINE															
RPM	1400	1400	1100	1150											
Air Manifold Pressure - Left	26	26	23	23											
Air Manifold Pressure - Right	—	—	—	—											
Cat. Diff. Pressure	4.6	4.4	3.7	3.4											
Pre Cat. Temperature	714	712	691	684											
Post Cat. Temperature	709	707	689	678											
(mV) - NOX ppm	156	172	170	177											
Engine Water Temperature	190°	190°	190	190											
Engine Water Pressure	34	34	28	31											
Auxiliary Water Temperature	—	—	—	—											
Auxiliary Water Pressure	—	—	—	—											
Cylinder 1 Temperature	1124	1125	1083	1064											
Cylinder 2 Temperature	1144	1144	1063	1077											
Cylinder 3 Temperature	1129	1125	1085	1066											
Cylinder 4 Temperature	1110	1108	1040	1043											
Cylinder 5 Temperature	1177	1179	1132	1100											
Cylinder 6 Temperature	1163	1159	1084	1083											
Cylinder 7 Temperature	1118	1115	1074	1058											
Cylinder 8 Temperature	1113	1109	1047	1050											
Cylinder 9 Temperature	1111	1106	1065	1047											
Cylinder 10 Temperature	1126	1125	1053	1057											
Cylinder 11 Temperature	1085	1084	1041	1027											
Cylinder 12 Temperature	1106	1107	1047	1054											
Cylinder 13 Temperature	1083	1083	1041	1032											
Cylinder 14 Temperature	1116	1117	1058	1060											
Cylinder 15 Temperature	1132	1137	1069	1075											
Cylinder 16 Temperature	1102	1099	1038	1046											
Jacket Water Temperature	183°	181°	181	183											
Water Level - Coolant	FULL	FULL	FULL	FULL											
Exhaust Temperature	1121	1119	1053	1060											
Engine Oil Pressure	64	63	62	63											
Engine Oil Temperature	192°	192°	190°	189°											

DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
[redacted]															
Day Tank Oil Level	1/2+	1/2-	1/2-	1/2											
Oil Crank Case Level	FULL	FULL	FULL	FULL											
Oil Differential Pressure	7.8	7.6	7.5	7.3											
Boost	26	25	23	23											
Engine Hours On	24	24	24	24											
Engine hours Off	Ø	Ø	Ø	Ø											
Engine Hours Total 18720	18745	18768	18792	18818											
Turbo L Temperature	837	837	806	805											
Turbo R Temperature	809	811	805	799											
[redacted]															
Suction Pressure	80	76	80	76											
Interstage Pressure	193/538	182/502	194/555	187/646											
Discharge Pressure	828	807	991	990											
First Stage Suction Temp.	69°	67°	67°	76°											
First Stage Discharge Temp.	216/219	212/216	208/207	214/217											
Second Stage Suction Temp.	90°	86°	82°	100°											
Second Stage Dischg Temp.	246	241	235	255											
Third Stage Suction Temp.	76°	72°	74°	88°											
Third Stage Discharge Temp.	174	171	194	214											
1 & 3 Lubricator Sec.	7.0	7.2	9.0	9.0											
2 & 4 Lubricator Sec.	7.0	7.0	9.0	8.8											
Compressor Oil Pressure	60	60	58	60											
Differential Oil Pressure	6	6	6	6											
Compressor Oil Temperature	151°	151°	151°	151°											
Oil Crank Case Level	1/2	1/2	1/2	1/2											
Day Tank Oil Level	3/4	3/4	3/4	3/4											
Fuel Use	75.73	75.89	76.04	76.20											
Initials/Time	CB	CB/1020	CB/1010	CB											
Comments:															

ENERGY TRANSFER

DAILY READINGS
PREMIER DE BEQUE
BUZZARD NGL For Month Of: OCTOBER, 2010

DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Time/Intials	CB	CB/1030	CB/1020	CB											
Suction Pressure	4	4	3	5											
Suction Temp	72°	72°	72	72											
Interstage Pressure	50	50	46	58											
Interstage Temp	140°	140°	140°	140°											
Discharge Pressure	150	145	140	174											
Discharge Temp	180°	180°	180°	200°											
Compressor Oil Pressure	60	60	60	55											
Compressor Oil Tank	15	22	24	20											
Economizer Level	0	0	0	0											
Economizer Temp	—	—	—	—											
Economizer PSI	90	90	90	100											
Accumulator Level %	0%	0%	0%	0%											
Chiller Level %	60%	60%	60%	60%											
Chiller Temp.	-20°	-22°	-22°	-17°											
Chiller PSI	4	4	4	4											
Stabilizer PSI	180	180	180	180											
Stabilizer Temp.	232°	230°	234°	230°											
Stabilizer Level	4.0	4.5	4.5	4.5											
Free Water KO PSI	540	520	560	540											
Free Water KO PSI	—	—	—	—											
Free Water KO Temp	94°	90°	88°	104°											
Free Water KO Level	[redacted]	DR	DR	DR											
3 Phase PSI	540	510	550	540											
3 Phase Temp	-12°	-14°	-14°	-10°											
3 Phase Glycol Level	4.0	3.0	3.0	3.0											
3 Phase Product Level	4.0	4.0	4.0	4.0											
Hours Since Last PM	—	—	—	—											
Total Hours On	24	24	24	24											
Comments															

ETC Canyon Pipeline, LLC

DeBeque Compressor Station
Liquids Report

Month of OCTOBER 2010

DATE	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
300 BBLS Tank Start Level	10'4"	10'5"													
Overnight Liquids 300 BBLS	—	1.67													
Current BBLS On Hand	207.08	208.75													
BBLS Sold	0	0													
Bronco Pig Y/N / BBLS	N	N													
Premier Pig Y/N / BBLS	N	N													
Ucarsol Tank Level	1/2	1/2													
Amine Water Tank Level	1/4	1/4													
CO2 Vent Tank Level	1/2	1/2													
Gen Set Oil Day Tank Level	3/4	3/4													
Gen Set Antifreeze Tank Level	FULL	FULL													
Comp Oil Storage Tank Level															
TEG Glycol Tank Level	1/2	1/2													
Used Oil Tank Level															
Battery Building Volt / Amps															

Foundation Creek Gas Plant Flare

Air Pollution Testing, Inc. : Analyzer Calibration Datasheet

Facility : Foundation Creek	Date : 10-6-10
Location : Rangley CO	APT Job # : ETC0305
Unit : Flare	Page # :

Analyzer Information

Analyzer Type	O2	CO2	CH4	NM		
Analyzer ID #	1420C-7	1415C-9	55I	55I		
Analyzer Scale	0-25	0-20	0-5000	0-5000		
Calibration Range	0-21.1	0-19.7	0-1500	0-847		

Calibration Gas Cylinder Information
(Cylinder ID#/Expiration date and Concentration)

Analyzer Type	O2	CO2	CH4	NM	NM	
Zero	0	0	0	0	0	
CC#						
Expiration date						
Low			310 ✓	30 ✓	303 ✓	
CC#			AAL19994		ALM023575	
Expiration date			6-13		4-13	
Mid	10.0 ✓	10.1 ✓	759 ✓	50.1 ✓	493 ✓	
CC#	ALM017814 →		ALM061244		ALM018204	
Expiration date	6-13 →		6-13 ✓	✓	8-13 ✓	
High	21.1 ✓	19.7 ✓	1500	84.5 ✓	847 ✓	5020
CC#	ALM022943 →		ALM03634		CC279553	CC118573
Expiration date	4-13 →		6-13		7-13	5-11

Calibration Error

Analyzer Type	O2	CO2	CH4	NM	NM	
Zero	0.0	0.0	3.8	0.3	1.1	
Low			310.9	30.4	305.2	
Mid	10.0	10.1	760.1	51.9	491	
High	21.1	19.7	1507.1	84.6	945.2	

4765

Initial Bias Check

Run #: Start: Stop:

Analyzer Type	O2	CO2	CH4	NM	NM	
Zero	0.1	0.0	1.6	1.1	0.0	
Low						
Mid	10.0	10.1	295.9	31.2	310.6	
High						

4766.9

Air Pollution Testing, Inc. : Analyzer Calibration Data Sheet

Facility : Foundation Creek — Date : 10-6-10

Location : Rangely CO — APT Job # : ETC 0305

Unit : flare — Page # :

Run # : 1 — Start Time : 1411 — Stop Time : 1511

Calibration Results

Analyzer Type	O2	CO2	CH4	NM		
Zero	-0.1	0.0	3.3	1.9		
Low						
Mid	9.9	10.2	301.4	309.6		
High				4854		

Run # : 2 — Start Time : 1553 — Stop Time : 1632

Calibration Results

Analyzer Type	O2	CO2	CH4	NM		
Zero	0.0	0.1	1.0	0.1		
Low						
Mid	9.9	10.1	304	313.0		
High				4849		

Run # : 3 — Start Time : 1720 — Stop Time : 1820

Calibration Results

Analyzer Type	O2	CO2	CH4	NM		
Zero	0.0	0.0	1.4	-0.8		
Low						
Mid	10.2	10.2	295.4	296.3		
High				4678		

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # : ETC 0305
Facility : ~~Greenwood~~ Foundation Creek
Date : ~~5-10~~ 10-6-10
Probe ID : P-498
Pilot Constant : ~~.844~~ .82

Operator : Brenden Cohen
Site : Foundation Creek

Points : 1 2 3 4 5 6 7 8 9 10 11 12

Stack Diameter (inches) : 36"
Upstream Disturbance (inches) :
Downstream Disturbance (inches) :
Schematic of Sampling Location :

Run 1-1 outlet

O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : .015 Pb ("Hg) : 794
Start Time : 14:12 Stop Time : 1420
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.03	870	
2	.04	878	
3	.05	879	
4	.05	940	
5	.05	985	
6	.045	887	
7	.05	845	
8	.04	899	
2-1	.02	835	
2	.03	845	
3	.035	857	
4	.04	889	
5	.05	910	
6	.05	920	
7	.05	930	
8	.055	940	
Averages :	.205	887.4	

Run 1-2 outlet

O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : .01 Pb ("Hg) : 794
Start Time : 1423 Stop Time : 1430
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.02	920	
2	.02	950	
3	.03	954	
4	.04	950	
5	.03	950	
6	.04	942	
7	.05	938	
8	.05	922	
2-1	.02	910	
2	.03	915	
3	.03	922	
4	.04	930	
5	.04	935	
6	.04	947	
7	.05	950	
8	.05	951	
Averages :	0.188	936.6	

.1966
909.25

Run 1-3 outlet

O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : .01 Pb ("Hg) : 794
Start Time : 1435 Stop Time : 1443
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.02	920	
2	.03	910	
3	.04	905	
4	.04	900	
5	.05	880	
6	.05	870	
7	.05	880	
8	.05	900	
2-1	.02	~~860~~ 890	
2	.02	890	
3	.03	910	
4	.04	920	
5	.05	930	
6	.05	935	
7	.055	930	
8	.045	920	
Averages :	0.197	903.75	

Reviewers Signature :

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # : ETC-0305 | Operator : Brendan Cohen

Facility : ~~Geesewood~~ | Site : Foundation Creek

Date : 10-5-10

Probe ID : P4a8

Pitot Constant : ~~.844~~ .821

Points : 1 2 3 4 5 6 7 8 9 10 11 12

Stack Diameter (inches) :

Upstream Disturbance (inches) :

Downstream Disturbance (inches) :

Schematic of Sampling Location :

Run # : 2-1 outlet

O2% : CDAS | CO2% : CDAS

H20% : CDAS | measured / estimate

Ps ("H2O) : CDAS .015 | Pb ("Hg) : 794

Start Time : 1535 | Stop Time : 1542

Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	~~.003~~	875	
2	.003	~~880~~	
3	.04	888	
4	.04	897	
5	.05	910	
6	.04	920	
7	.02	925	
8	.02	928	
2-1	.02	930	
2	.03	925	
3	.04	918	
4	.05	910	
5	.04	905	
6	.045	~~888~~	
7	.04	870	
8	.03	870	
Averages :	0.171	902.5	

Run # : 2-2 outlet

O2% : CDAS | CO2% : CDAS

H20% : CDAS | measured / estimate

Ps ("H2O) : .015 | Pb ("Hg) : 794

Start Time : 1545 | Stop Time : 1552

Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	~~.003~~ .03	880	
2	~~.003~~ .03	895	
3	~~.004~~ .04	899	
4	.005	901	
5	~~.004~~	910	
6	.045	920	
7	.04	925	
8	.03	930	
2-1	.02	910	
2	.02	920	
3	.03	930	
4	.04	935	
5	.045	930	
6	.05	925	
7	.05	920	
8	.05	910	
		915	
Averages :	0.175	~~0.18~~ 0.175	

Run # : 2-3 outlet

O2% : CDAS | CO2% : CDAS

H20% : CDAS | measured / estimate

Ps ("H2O) : .015 | Pb ("Hg) : 794

Start Time : 1555 | Stop Time : 1601

Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.02	875	
2	.03	884	
3	.04	888	
4	.035	895	
5	.04	910	
6	.05	920	
7	.045	928	
8	.04	920	
2-1	.02	900	
2	.03	910	
3	.035	915	
4	.04	914	
5	.05	920	
6	.05	928	
7	.05	922	
8	.04	918	
		908.9	
Averages :	0.194	~~909.2~~	

Reviewers Signature :

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # : ETC-0303
Facility : Greasewood
Date : ~~10-5-10~~ 10-6-10
Probe ID : P498
Pitot Constant : .841 .821
Operator : Brendan Chen
Site : Foundation Creek

Points : 1 2 3 4 5 6 7 8 9 10 11 12

Stack Diameter (inches) :
Upstream Disturbance (inches) :
Downstream Disturbance (inches) :
Schematic of Sampling Location :

Run # : 3-1 outlet

O2% : COAS CO2% : COAS
H20% : COAS measured / estimate
Ps ("H2O) : -.015 Pb ("Hg) : 794
Start Time : 1720 Stop Time : 1728
Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.03	870	
2	.035	880	
3	104	910	
4	104	920	
5	1045	928	
6	105	935	
7	.1045	940	
8	104	910	
2-1	102	880	
2	102	890	
3	103	905	
4	104	912	
5	105	930	
6	104	935	
7	104	930	
8	103	910	
Averages :	0.191	911.6	

Run # : 3-2 outlet

O2% : COAS CO2% : COAS
H20% : COAS measured / estimate
Ps ("H2O) : -0.015 Pb ("Hg) : 794
Start Time : 1731 Stop Time : 1739
Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.03	880	
2	103	890	
3	104	900	
4	.045	910	
5	105	915	
6	104	920	
7	.03	930	
8	.02	920	
2-1	.02	900	
2	.02	910	
3	103	915	
4	.035	918	
5	104	920	
6	105	925	
7	103	928	
8	.02	920	
Averages :	~~0.17~~ 0.180	912.58	

Run # : 3-3 outlet

O2% : COAS CO2% : COAS
H20% : COAS measured / estimate
Ps ("H2O) : -0.005 Pb ("Hg) : 794
Start Time : 1743 Stop Time : 1750
Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.03	890	
2	.02	899	
3	.04	909	
4	.03	910	
5	.05	920	
6	.04	928	
7	.03	930	
8	.02	915	
2-1	.02	898	
2	.03	890	
3	.02	905	
4	.03	912	
5	.035	918	
6	.04	920	
7	.05	930	
8	.04	910	
Averages :	0.179	911.80	

Reviewers Signature :

Site =

Air Pollution Testing, Inc. : EPA M- - Moisture Determination Datasheet

APT Job #: ETC 0305 | Date: 10-5-10

Location: @ Foundation Creek | Operator: Brendan Cohen

Run #: 1 (outlet) | Meter Box ID: MS-10

Meter Box Yd: 980 | Meter DH@: 1.71

Pre-Test Pump Leak Check: 0.00@ 8"/Hg | Post-Test Pump Leak Check: .00@10"/Hg

CO2 (%): CDAS | O2 (%): CDAS

Ambient Temperature (oF): 70 | Barometric Pressure (mbar): 794

Probe Length (ft): 2ft | Moisture (grams):

Static Pressure (" H2O): CDAS | Start Time: ~~13:34~~ 14:11

Method: 4 | Stop Time: ~~13:34~~ 15:11

Sampling Time (minutes)	Vacuum (" Hg)	Orifice Setting (" H2O)	Meter Temp. Inlet (oF)	Meter Temp. Outlet (oF)	Condenser Temp. (oF)	Meter Volume (ft3) Initial Volume	Notes
						~~698.072~~ 712.010	
5	1	1.0	~~74~~	~~70~~	~~31~~	716.12	
10	1	1.0	75	73	32	719.80	
15	1	1.0	75	75	33	723.4	
20	1	1.0	75	76	34	727.01	
25	1	1.0	75	76	36	~~730.5~~	
30	1	1.0	75	76	37	734.10	
35	1	1.0	75	76	38	737.72	
40	1	1.0	75	77	39	741.625	
45	1	1.0	75	77	39	745.300	
50	1	1.0	75	77	39		
55	1	1.0	75	77	39	752.632	
60	1	1.0	75	77	39	756.~~295~~	756.295
						402.8	~~459.5~~
						399.2	~~306.2~~
						306.2	~~399.2~~
						459.5	~~402.8~~
total	measure	average	average	maximum	difference		
60	1	1.0	75.3	36.7	44.285		

75.3

Schematic of Stack:

26 J

Stack ID (inches):

Upstream Disturbance (inches):

Downstream Disturbance (inches):

Moisture Determination

Imp. #	Tare	Final	Gain
→	~~402.6~~	416.1	13.3
→ 2	~~452.2~~	453.4	1.2
→ 3	~~307.4~~	306.0	1.8
→ 4	~~456.8~~	465.0	5.5
		Total	24.8

Reviewers Signature

LA.P

Foundation Creek

Air Pollution Testing, Inc. : EPA — **Moisture Determination Datasheet**

APT Job #: ETC-0305 | Date: 10/6/10 | CO2 (%): 0.0 | O2 (%): 0.0

Location: Greasewood Pt. | Operator: Brenda Cohen | Ambient Temperature (oF): | Barometric Pressure (mbar): 794

Run #: 2 (a+let) | Meter Box ID: MS-10 | Probe Length (ft): 3.5 | Moisture (grams): 30.2

Meter Box Yd: .980 | Meter DH@: 1.71 | Static Pressure (" H2O): | Start Time: 1532

Pre-Test Pump Leak Check: 0.0 @ 8" Hg | Post-Test Pump Leak Check: 0.0 @ 8" Hg | Method: 4 | Stop Time: 1632

Sampling Time (minutes)	Vacuum (" Hg)	Orifice Setting (" H2O)	Meter Temp. Inlet (oF)	Meter Temp. Outlet (oF)	Condenser Temp. (oF)	Meter Volume (ft3) Initial Volume	Notes
						786.366	
5	1	1.0	78	79	36	789.91	
10	1	1.0	79	80	37	763.43	
15	1	1.0	80	82	38	766.95	
20	1	1.0	80	83	38	770.48	
25	1	1.0	80	83	38	774.055	
30	1	1.0	80	83	38	777.52	
35	1	1.0	80	83	38	781.011	
40	1	1.0	80	82	37	884.500	
45	1	1.0	80	82	37	887.98	
50	1	1.0	80	82	37	891.055	
55	1	1.0	80	82	37	893.31	
60	1	1.0	79	81	37	798.700	
total	measurement	average	average	average	average	difference	
60	1	1.0	80.75	873	42.339		

Schematic of Stack:

Stack ID (inches):

Upstream Disturbance (inches):

Downstream Disturbance (inches):

Moisture Determination

Imp. #	Tare	Final	Gain
1	416.1	434.6	18.5
2	403.4	407.3	3.9
3	308.0	309.2	1.2
4	465.0	471.6	6.6
		Total	30.2

Reviewed Signature

Foundation Creek

Air Pollution Testing, Inc. : EPA — **Moisture Determination Datasheet**

APT Job #: ETC 0305 | Date: 10-6-10

Location: Greasewood Pl. | Operator: Brendon Cohen

Run # 3 (outlet) 950 | Meter Box ID: MS-10

Meter Box Yd: | Meter DH@: 1.71

Pre-Test Pump Leak Check: | Post-Test Pump Leak Check:

CO2 (%): CDAS | O2 (%): CDAS

Ambient Temperature (oF): | Barometric Pressure (mbar):

Probe Length (ft): 2FT | Moisture (grams):

Static Pressure (" H2O): | Start Time: 1720

Method: 4 | Stop Time: 1802 20

Sampling Time (minutes)	Vacuum (" Hg)	Orifice Setting (" H2O)	Meter Temp. Inlet (oF)	Meter Temp. Outlet (oF)	Condenser Temp. (oF)	Meter Volume (ft3) Initial Volume	Notes
						798.777	
5	1	1.8	70	69	37	802.27	
10	1	1.0	70	69	37	805.77	
15	1	1.0	68	67	37	809.17	
20	1	1.0	65	65	37	812.67	
25	1	1.0	62	63	37	816.17	
30	1	1.0	60	61	37	819.57	
35	1	1.0	55	57	37	823.07	
40	1	1.0	52	53	37	826.57	
45	1	1.0	52	53	37	829.97	
50	1	1.0	50	51	37	833.96	
55	1	1.0	50	51	37	836.96	
60	1	1.0	50	51	37	840.750	
total	maximum	average	average	maximum	difference		
60	1	1.0	58.91	37	41.973		

Schematic of Stack:

Stack ID (inches):

Upstream Disturbance (inches):

Downstream Disturbance (inches):

Moisture Determination

Imp. #	Tare	Final	Gain
1	439.6	436.0	1.4
2	407.2	419.	11.8
3	309.2	312.2	3.
4	471.6	474.6	3.0
		Total	19.2

Reviewers Signature:

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # : ETC 0305
Facility : ~~Greenwood~~ Templeton Creek
Date : 10-5-10
Probe ID : P-498
Pitot Constant : ~~.847~~ .821

Operator : Brendan Cohen
Site :
Points : 1 2 3 4 5 6 7 8 9 10 11 12

Stack Diameter (inches) : 4
Upstream Disturbance (inches) :
Downstream Disturbance (inches) :
Schematic of Sampling Location :

Run # : 1-1 inlet			
O2% : CDAS	CO2% : CDAS	H20% : CDAS	measured / estimate
Ps ("H2O) : + 8.0	Pb ("Hg) : 794	Start Time : 1448	Stop Time : 1453

Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1	.015	67	
2	.02	67	
3	.025	68	
4	.025	68	
5	.021	68	
6	.025	68	
Averages :	0.147	67.7	

Run # : 1-2 inlet			
O2% : CDAS	CO2% : CDAS	H20% : CDAS	measured / estimate
Ps ("H2O) : 8.0	Pb ("Hg) : 794	Start Time : 1457	Stop Time : 1502

Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1	.015	68	
2	.02	68	
3	.025	68	
4	.025	68	
5	.03	68	
6	.025	68	
Averages :	.152	68	

Run # : 1-3 inlet			
O2% : CDAS	CO2% : CDAS	H20% : CDAS	measured / estimate
Ps ("H2O) : 8.0	Pb ("Hg) : ~~7~~94	Start Time : 1505	Stop Time : 1509

Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.015	68	
2	.02	68	
3	.025	68	
4	.02	68	
5	.03	68	
6	.02	68	
Averages :	0.146	68	

Reviewers Signature :

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # : IETC - 0305
Facility : ~~Greenwood~~
Date : 10-5-10
Probe ID : P 408
Pitot Constant : .84 T .821

Operator : Brenda Cohen
Site : Foundation Creek

Points : 1 2 3 4 5 6 7 8 9 10 11 12

Stack Diameter (inches) : 4
Upstream Disturbance (inches) :
Downstream Disturbance (inches) :
Schematic of Sampling Location :

	Run 2-1 inlet	Run 2-2 inlet	Run 2-3 inlet
O2% :	CDAS	CDAS	CDAS
CO2% :	CDAS	CDAS	CDAS
H20% :	CDAS	CDAS	CDAS
measured / estimate			
Ps ("H2O) :	9.0	9.0	9.0
Pb ("Hg) :	794	794	794
Start Time :	1605	1614	1620
Stop Time :	1611	1618	1625
Post Test Pilot Leak Check Good? :	✓	✓	✓

Point #	Delta P	Ts	Notes
1-1	.015	64	
2	.102	64	
3	.103	64	
4	.035	64	
5	.103	64	
6	.015	64	
Averages :	.1533	64	

Point #	Delta P	Ts	Notes
1-1	.015	62	
2	.103	62	
3	.025	62	
4	.103	62	
5	1025	62	
6	.015	62	
Averages :	.1513	62	

Point #	Delta P	Ts	Notes
1	.015	60	
2	.102	60	
3	.025	60	
4	.103	60	
5	.103	60	
6	.015	60	
Averages :	.1485	60	

Reviewers Signature :

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # : ETL 0305 | Operator :
Facility : Foundation Creek | Site :
Date : 10-6-10
Probe ID : D-498
Pilot Constant : .841, .821

Points : 1 2 3 4 5 6 7 8 9 10 11 12

Stack Diameter (inches) : 4
Upstream Disturbance (inches) :
Downstream Disturbance (inches) :
Schematic of Sampling Location :

Run # : 3-1

O2% : CDAS | CO2% : CDAS
H20% : CDAS | measured / estimate
Ps ("H2O) : 8.5 | Pb ("Hg) : 794
Start Time : 1755 | Stop Time : 1801
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1	.101	56	
2	.095	56	
3	.102	56	
4	.025	56	
5	.102	56	
6	.095	56	
Averages :	.131	56	

Run # : 3-2

O2% : CDAS | CO2% : CDAS
H20% : CDAS | measured / estimate
Ps ("H2O) : 8.5 | Pb ("Hg) : 794
Start Time : 1804 | Stop Time : 1811
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1	.101	54	
2	.02	54	
3	.025	54	
4	.025	54	
5	.102	54	
6	.015	54	
Averages :	.137	54	

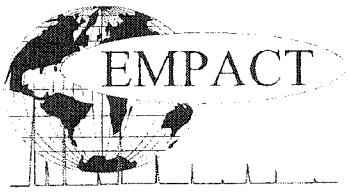
Run # : 3-3

O2% : CDAS | CO2% : CDAS
H20% : CDAS | measured / estimate
Ps ("H2O) : 8.5 | Pb ("Hg) : 794
Start Time : 1814 | Stop Time : 1820
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1	.015	50	
2	.03	50	
3	.025	50	
4	.025	50	
5	.03	50	
6	.02	50	
Averages :	.144	50	

Reviewers Signature :

Inlet Gas Analysis



NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**07**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 20, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 6, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	501
NAME/DESCRIP :	ETC 0305.FC.1A; 25A/18		

FIELD DATA

SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.01	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	0.02	-	-
NITROGEN	0.44	-	-
CO2	2.59	-	-
METHANE	64.13	-	-
ETHANE	6.68	1.776	1.786
PROPANE	6.52	1.786	1.796
ISOBUTANE	2.17	0.706	0.710
N-BUTANE	4.75	1.489	1.497
ISOPENTANE	2.68	0.975	0.980
N-PENTANE	2.55	0.919	0.924
HEXANES+	7.46	3.219	3.236
TOTAL	100.00	10.870	10.929

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1757.7	1767.3
GROSS SATURATED REAL =	1726.9	1736.6

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	1.0861
COMPRESSIBILITY FACTOR :	0.99115

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS

EMPACT

NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**08**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 20, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 6, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	873
NAME/DESCRIP :	ETC 0305.FC.1B; 25A/18		

FIELD DATA

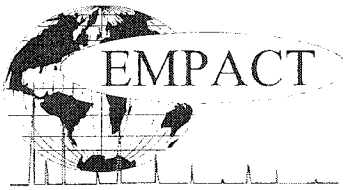
SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.01	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	0.02	-	-
NITROGEN	0.38	-	-
CO2	2.52	-	-
METHANE	64.11	-	-
ETHANE	6.68	1.776	1.786
PROPANE	6.52	1.786	1.796
ISOBUTANE	2.17	0.706	0.710
N-BUTANE	4.77	1.495	1.503
ISOPENTANE	2.69	0.978	0.984
N-PENTANE	2.56	0.923	0.928
HEXANES+	7.57	3.266	3.284
TOTAL	100.00	10.930	10.991

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1764.7	1774.4
GROSS SATURATED REAL =	1733.8	1743.5

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	1.0889
COMPRESSIBILITY FACTOR :	0.99108

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC). 2145, & 2172 CURRENT PUBLICATIONS



NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**09**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 20, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 6, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	149
NAME/DESCRIP :	ETC 0305.FC.2A; 25A/18		

FIELD DATA

SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.01	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	0.01	-	-
NITROGEN	0.38	-	-
CO2	2.15	-	-
METHANE	68.32	-	-
ETHANE	6.66	1.771	1.781
PROPANE	6.37	1.745	1.754
ISOBUTANE	2.13	0.693	0.697
N-BUTANE	4.60	1.442	1.450
ISOPENTANE	2.59	0.942	0.947
N-PENTANE	2.41	0.869	0.873
HEXANES+	4.37	1.886	1.896
TOTAL	100.00	9.348	9.398

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1618.3	1627.2
GROSS SATURATED REAL =	1590.0	1598.9

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) : 0.9877

COMPRESSIBILITY FACTOR : 0.99290

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS

EMPACT

NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**10**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 20, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 6, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	403
NAME/DESCRIP :	ETC 0305.FC.2B; 25A/18		

FIELD DATA

SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.01	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	0.01	-	-
NITROGEN	0.41	-	-
CO2	2.11	-	-
METHANE	67.30	-	-
ETHANE	6.57	1.747	1.757
PROPANE	6.29	1.723	1.732
ISOBUTANE	2.11	0.687	0.690
N-BUTANE	4.59	1.439	1.447
ISOPENTANE	2.64	0.960	0.965
N-PENTANE	2.48	0.894	0.899
HEXANES+	5.48	2.364	2.377
TOTAL	100.00	9.814	9.867

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1666.3	1675.4
GROSS SATURATED REAL =	1637.1	1646.3

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	1.0187
COMPRESSIBILITY FACTOR :	0.99234

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS

EMPACT

NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**11**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 20, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 6, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	332
NAME/DESCRIP :	ETC 0305.FC.3A; 25A/18		

FIELD DATA

SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.01	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	0.01	-	-
NITROGEN	0.37	-	-
CO2	2.21	-	-
METHANE	67.40	-	-
ETHANE	6.54	1.739	1.749
PROPANE	6.30	1.726	1.735
ISOBUTANE	2.12	0.690	0.694
N-BUTANE	4.61	1.445	1.453
ISOPENTANE	2.65	0.964	0.969
N-PENTANE	2.50	0.901	0.906
HEXANES+	5.28	2.278	2.291
TOTAL	100.00	9.743	9.797

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1658.8	1667.9
GROSS SATURATED REAL =	1629.8	1638.9

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	1.0149
COMPRESSIBILITY FACTOR :	0.99242

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS

EMPACT

NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**12**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 20, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 6, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	1168
NAME/DESCRIP :	ETC 0305.FC.3B; 25A/18		

FIELD DATA

SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.01	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	0.03	-	-
NITROGEN	0.47	-	-
CO2	2.20	-	-
METHANE	64.38	-	-
ETHANE	6.23	1.657	1.666
PROPANE	6.00	1.644	1.653
ISOBUTANE	2.04	0.664	0.667
N-BUTANE	4.49	1.407	1.415
ISOPENTANE	2.70	0.982	0.987
N-PENTANE	2.61	0.941	0.946
HEXANES+	8.84	3.814	3.835
TOTAL	100.00	11.109	11.169

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1801.6	1811.5
GROSS SATURATED REAL =	1770.1	1780.0

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	1.1085
COMPRESSIBILITY FACTOR :	0.99062

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS

Operating Data

Plant Pressure = 55 (A) / 55 (B)
Discharge 706
NGL Sweet 62
outlet flow 8.8 MM
Inlet A/B 6.664 / 2.5 MM
Skid temp 1654

DeHy contactor 68
~~crude~~ PSI 720
Injection Rate 2.65 @ GPM
Reboiler Temp 330
flash tank 42 PSI / 76°F

~~E~~ NGL Skid
Inlet 72°F / 700 PSI
Tower 260 PSI / 90 °F
Ethane pressure 666 PSI / -10°F
Reboiler 230 °F
3.85 GPM

Rifle Boulton Station Flare

Air Pollution Testing, Inc. : Analyzer Calibration Datasheet

Facility : Rifle Baalta	Date : 10-7-10
Location : Rifle CO	APT Job # : ETC0305
Unit : Flare	Page # :

Analyzer Information

Analyzer Type	O2	CO2	CH4	NM		
Analyzer ID #	1420 C-7	1415 C-9	55 I	55 I		
Analyzer Scale	0-25	0-20	0-5000	0-5000		
Calibration Range	0-21.1	0-19.7	0-1500	0-847		

Calibration Gas Cylinder Information
(Cylinder ID#/Expiration date and Concentration)

Analyzer Type	O2	CO2	CH4	NM		
Zero	0	0	0	0		
CC#						
Expiration date						
Low			310	30		
CC#			AAL19994	ALM052218		
Expiration date			6-13	4-13		
Mid	10.0	10.1	757	50.1		
CC#	ALM017884	—	ALM061294	CC131241		
Expiration date	6-13	—	6-13	11-11		
High	21.1	19.7	1500	845		
CC#	ALM000243	—	ALM013634	CC1098539		
Expiration date	4 13	—	6-13			

Calibration Error

Analyzer Type	O2	CO2	~~NM~~ CH4	~~CH4~~ NM		
Zero	0.0	0.0	0.1	~~1507.9~~	2.4	
Low			30.9	311.3		
Mid	10.0	10.0	50.8	766.6		
High	21.1	19.7	85.1	1507.9		

Initial Bias Check

Run #: Start: Stop:

Analyzer Type	O2	CO2	CH4	NM		
Zero	0.0	0.05	1.2	1.2		
Low						
Mid	10.0	10.1	308.8	32.4		
High						

Air Pollution Testing, Inc. : Analyzer Calibration Data Sheet

Facility : Rifle Boulder Date : 10-7-10

Location : Rifle Co APT Job # : ETL 0305

Unit : Flare Page # :

Run # : 1 Start Time : 1217 Stop Time : 1317

Calibration Results

Analyzer Type	O_2	CO_2	CH_4	NM		
Zero	0.0	0.0	0.8	0.6		
Low						
Mid	9.9	10.1	301.2	30.6		
High						

Run # : 2 Start Time : 1339 Stop Time : 1439

Calibration Results

Analyzer Type	O_2	CO_2	CH_4	NM		
Zero	0.0	0.0	1.8	0.0		
Low						
Mid	9.9	10.0	302.4	30.0		
High						

Run # : 3 Start Time : ~~1357~~ 1457 Stop Time : 1557

Calibration Results

Analyzer Type	O_2	CO_2	CH_4	NM		
Zero	0.1	-0.1	0.9	0.6		
Low						
Mid	10.0	9.83	309.1	30.1		
High						

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # : ETC-0305 | Operator : Brendan Cohen
Facility : Rifle Bolton | Site :
Date : 10-6-10
Probe ID : P498
Pilot Constant : ~~.871~~ orig .821

Points : 1 2 3 4 5 6 7 8 9 10 11 12

Stack Diameter (inches) : 40.5"
Upstream Disturbance (inches) :
Downstream Disturbance (inches) :
Schematic of Sampling Location : 40.5"

Run # : 1-1 outlet

O2% : CDAS | CO2% : CDAS
H20% : CDAS | measured / estimate
Ps ("H2O) : .001 | Pb ("Hg) : 8.10
Start Time : 12:18 | Stop Time : 12:24
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.03	81	
1-2	.025	81	
3	.02	81	
4	.015	81	
5	.015	81	
6	.01	81	
7	.005	81	
8	.005	81	
2-1	.01	81	
2	.01	81	
3	.005	80	
4	.005	80	
5	.01	80	
6	.005	80	
7	.005	80	
8	.001	80	
Averages :	0.00983	80.8	

Run # : 1-2 outlet

O2% : CDAS | CO2% : CDAS
H20% : CDAS | measured / estimate
Ps ("H2O) : .001 | Pb ("Hg) : 8.10
Start Time : 12:27 | Stop Time : 12:32
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	0.015	88	
2	.015	88	
3	.015	88	
4	.01	88	
5	.01	88	
6	.01	88	
7	.005	89	
8	.005	88	
2-1	.02	87	
2	.02	87	
3	.015	87	
4	.015	87	
5	.01	87	
6	.005	87	
7	.005	87	
8	.005	87	
Averages :	.09126	87.5	

.10204

Run # : 1-3 outlet

O2% : CDAS | CO2% : CDAS
H20% : CDAS | measured / estimate
Ps ("H2O) : .001 | Pb ("Hg) : 8.10
Start Time : 12:36 | Stop Time : 12:41
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.02	89	
2	.025	88	
3	.02	88	
4	.015	88	
5	.01	88	
6	.01	88	
7	.005	88	
8	.005	88	
2-1	.015	89	
2	.015	89	
3	.01	89	
4	.01	89	
5	.005	89	
6	.005	89	
7	.005	89	
8	.005	89	
~~Averages :~~	.10113	85.6	
Averages :	.08663	88.5	

.10204

Reviewers Signature :

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # : ETC-0305
Facility : Rifle Bolton ETC
Date : ~~10-6-15~~ 10-7-15
Probe ID : P498
Pitot Constant : ~~.811~~ .821
Operator : Brenden Cohen
Site :

Points : 1 2 3 4 5 6 7 8 9 10 11 12

Stack Diameter (inches) : 40.5
Upstream Disturbance (inches) : 30"
Downstream Disturbance (inches) : 8"
Schematic of Sampling Location :

Run # : 2-1 outlet

O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : .001 Pb ("Hg) : 810
Start Time : 1340 Stop Time : 1347
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.005	107	
2	.02	107	
3	.025	108	
4	.02	108	
5	.015	107	
6	.015	107	
7	.01	106	
8	.01	106	
2-1	.005	106	
2	.005	106	
3	.01	107	
4	.005	107	
5	.005	108	
6	.01	108	
7	.005	107	
8	.005	107	
Averages :	0.099	107	

Run # : 2-2 outlet

O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : .001 Pb ("Hg) : 810
Start Time : 1350 Stop Time : 1357
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.01	110	
2	.015	111	
3	.02	111	
4	.015	110	
5	.02	110	
6	.015	110	
7	.01	109	
8	.005	109	
2-1	.005	109	
2	.01	109	
3	.01	110	
4	.01	110	
5	.005	111	
6	.005	111	
7	.005	110	
8	.005	110	
Averages :	0.094	110	

Run # : 2-3 outlet

O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : .001 Pb ("Hg) : 810
Start Time : 1400 Stop Time : 1407
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.005	108	
2	.01	108	
3	.015	109	
4	.02	109	
5	.02	108	
6	.015	108	
7	.01	107	
8	.005	107	
2-1	.005	107	
2	.005	107	
3	.01	108	
4	.01	108	
5	.005	109	
6	.01	109	
7	.005	108	
8	.005	107	
	.093		
	108.3		
Averages :	0.095	108	

Reviewers Signature :

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # :	ETC-0305	Operator :	Brendan Cohen
Facility :	RFE Bolton	Site :	
Date :	10-7-10	Points :	1 5 9 / 2 6 10 / 3 7 11 / 4 8 12
Probe ID :	D498		
Pilot Constant :	~~.84~~ .821 ✓		

Stack Diameter (inches) : 40.5
Upstream Disturbance (inches) : 30"
Downstream Disturbance (inches) : 8"
Schematic of Sampling Location :

Run # : 3-1 outlet

O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : .001 Pb ("Hg) : 8/10
Start Time : 1448 Stop Time : 1455
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.005	108	
2	.01	108	
3	.015	109	
4	.02	109	
5	.02	109	
6	.01	108	
7	.01	109	
8	.005	108	
2-1	.005	108	
2	.01	108	
3	.005	108	
4	.005	108	
5	.005	109	
6	.005	109	
7	.005	109	
8	.005	109	
Averages :	0.090	108.5	

Run # : 3-2 outlet

O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : .001 Pb ("Hg) : 8/10
Start Time : 1459 Stop Time : 1508
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.005	108	
2	.01	108	
3	.015	110	
4	.02	110	
5	.02	110	
6	.01	111	
7	.01	110	
8	.005	109	
2-1	.005	108	
2	.005	108	
3	.01	108	
4	.01	108	
5	.005	108	
6	.005	109	
7	.005	109	
8	.005	109	
Averages :	0.091	109	

Run # : 3-3 outlet

O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : .001 Pb ("Hg) : 8/10
Start Time : 1511 Stop Time : 1517
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.005	110	
2	.01	111	
3	.015	111	
4	.02	111	
5	.02	110	
6	.01	110	
7	.01	109	
8	.005	109	
2-1	.005	109	
2	.005	110	
3	.005	110	
4	.01	110	
5	.01	110	
6	.005	110	
7	.005	110	
8	.01	110	
		109.167	
		109.167	
Averages :	0.009	110	

Reviewers Signature :

Air Pollution Testing, Inc. : EPA M... - Moisture Determination Datasheet

APT Job #: ETC-0305 | Date: 10-6-10

Location: Rifle Bolton | Operator: Brendan Cohen

Run #: 1 (outlet) | Meter Box ID: MS-10

Meter Box Yd: .980 | Meter DH@: 1.71

Pre-Test Pump Leak Check: 0.000 12 | Post-Test Pump Leak Check: 0.000 12 hg

CO2 (%): CDAS | O2 (%): CDAS

Ambient Temperature (oF): 72 °F | Barometric Pressure (mbar): 840

Probe Length (ft): 25+ | Moisture (grams): 6.9

Static Pressure (" H2O): CDAS | Start Time: 12:17

Method: 9 | Stop Time: 13:17

Sampling Time (minutes)	Vacuum (" Hg)	Orifice Setting (" H2O)	Meter Temp. Inlet (oF)	Meter Temp. Outlet (oF)	Condenser Temp. °C	Meter Volume (ft3) Initial Volume	Notes
						840.908	
5	2	1.0	73	73	32	844.40	
10	2	1.0	74	74	32	848.08	
15	2	1.0	74	75	32	851.61	
20	2	1.0	74	76	32	855.01	
25	2	1.0	75	78	32	857.53	
30	2	1.0	76	80	32	861.95	
35	2	1.0	78	82	33	864.42	
40	2	1.0	79	84	33	867.93	
45	2	1.0	79	84	33	871.99	
50	2	1.0	79	84	34	875.65	
55	2	1.0	79	84	34	879.11	
60	2	1.0	79	84	34	882.575	
total	average	average	average	average	average	difference	
60	2	1.0	28.21	32.75	41.667		

Schematic of Stack:

Stack ID (inches):

Upstream Disturbance (inches):

Downstream Disturbance (inches):

Moisture Determination

Imp. #	Tare	Final	Gain
1	424.5	416.5	-8.0
2	434.5	441.5	+7.0
3	310.2	311.6	+1.4
4	440.1	446.1	+6.0
		Total	6.4

Reviewer Signature

Air Pollution Testing, Inc. : EPA [illegible] - Moisture Determination Datasheet

APT Job #: ETC-0305 | Date: 10-27-10

Location: Rifle Bolton | Operator: Brendan Cohen

Run #: 2 (outlet) | Meter Box ID: MS-10

Meter Box Yd: .980 | Meter DH@: 1.71

Pre-Test Pump Leak Check: 0.00@10" Hg | Post-Test Pump Leak Check: 0.00@10" Hg

CO2 (%): CDAS | O2 (%): CDAS

Ambient Temperature (oF): 77 | Barometric Pressure (mbar): 810

Probe Length (ft): 25ft | Moisture (grams): 5.1

Static Pressure (" H2O): CDAS | Start Time: 13:39

Method: 4 | Stop Time: 14:39

Sampling Time (minutes)	Vacuum (" Hg)	Orifice Setting (" H2O)	Meter Temp. Inlet (oF)	Meter Temp. Outlet (oF)	Condenser Temp. (oF) / °C	Meter Volume (ft3) (initial) Volume	Notes
						882.615	
5	1.0	1.0	79	82	33	886.250	
10	1.0	1.0	79	82	33	889.900	
15	1.0	1.0	79	82	33	893.30	
20	1.0	1.0	79	82	33	896.745	
25	1.0	1.0	79	82	34	899.999	
30	1.0	1.0	79	82	34	903.58	
35	1.0	1.0	79	82	34	906.98	
40	1.0	1.0	79	82	34	910.45	
45	1.0	1.0	79	82	34	913.90	
50	1.0	1.0	79	83	34	917.55	
55	1.0	1.0	79	82	34	920.89	
60	1.0	1.0	79	82	34	924.396	924.396
total	maximum	average	average	maximum	difference		
60	1.0	1.0	50.59	55.67	41.781		

Schematic of Stack:

Stack ID (inches): 405

Upstream Disturbance (inches): 30"

Downstream Disturbance (inches): 8"

Moisture Determination

Imp. #	Tare	Final	Gain
1	416.5	415.5	-1.0
2	445	440.8	-0.7
3	311.6	313.9	2.3
4	446.1	450.6	4.5
		Total	5.1

Reviewer Signature

Air Pollution Testing, Inc. : EPA M - Moisture Determination Datasheet

APT Job #: BTC-0305 Date: 10-[illegible]-10

Location: Ripley Bolton Operator: Brendan Cohen

Run #: 3 (outlet) Meter Box ID: MS-10

Meter Box Yd: .980 Meter DH@: 1.71

Pre-Test Pump Leak Check: 0.00 @ 10" hg Post-Test Pump Leak Check: 0.00 @ [illegible]" hg

CO2 (%): CDAS O2 (%): CDAS

Ambient Temperature (oF): Barometric Pressure (mbar): 810

Probe Length (ft): 27 Moisture (psms): 5.1

Static Pressure (" H2O): CDAS Start Time: 1457

Method: 4 Stop Time: 1557

Sampling Time (minutes)	Vacuum (" Hg)	Orifice Setting (" H2O)	Meter Temp. Inlet (oF)	Meter Temp. Outlet (oF)	Condenser Temp. (oF)	Meter Volume (ft3) Initial Volume	Notes
						924.431	
5	1.0	1.0	82	87	37	927.88	
10	1.0	1.0	82	87	37	931.34	
15	1.0	1.0	81	87	37	934.78	
20	1.0	1.0	81	87	37	938.24	
25	1.0	1.0	81	87	37	941.65	
30	1.0	1.0	81	86	37	945.13	
35	1.0	1.0	81	86	37	948.59	
40	1.0	1.0	80	86	38	952.04	
45	1.0	1.0	80	86	38	955.49	
50	1.0	1.0	80	86	38	958.89	
55	1.0	1.0	80	86	38	962.25	
60	1.0	1.0	80	86	38	965.731	
total	maximum	average	average	maximum	difference		
60	1.0	1.0	83.58	87.42	41.300		

Schematic of Stack:

958.89

Stack ID (inches):

Upstream Disturbance (inches):

Downstream Disturbance (inches):

Moisture Determination

Imp. #	Tare	Final	Gain
1	415.5	408.1	-7.4
2	440.8	444.4	3.6
3	313.9	317.9	4
4	450.6	455.5	4.9
		Total	5.1

Reviewers Signature

Air Pollution Testing Inc. : EPA Method 2 - Pilot Traverse Datasheet

Job # :	RTC-0305	Operator :	Gerson Cohen
Facility :	Rifle Bolton	Site :	
Date :	10-~~8~~-10	Points :	1 5 9 / 2 6 10 / 3 7 11 / 4 8 12
Probe ID :	P-448		
Pitot Constant :	~~0.811~~ .84		

Stack Diameter (inches) : ~~40.5~~ 4

Upstream Disturbance (inches) :

Downstream Disturbance (inches) :

Schematic of Sampling Location :

Run 1-1 inlet

O2% :	CDAS	CO2% :	CDAS
H20% :	CDAS	measured / estimate	
Ps ("H2O) :	.02	Pb ("Hg) :	8.10
Start Time :	12:45	Stop Time :	12:49

Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.101	85	
2	.101	85	
3	.101	85	
4	.005	84	
5	.005	84	
6	.101	84	
7			
8			
2-1			
2			
3			
4			
5			
6			
7			
8			
Averages :	0.090	84.5	

Run 1-2 inlet

O2% :	CDAS	CO2% :	CDAS
H20% :	CDAS	measured / estimate	
Ps ("H2O) :	.02	Pb ("Hg) :	8.10
Start Time :	12:53	Stop Time :	13:00

Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.101	85	
2	.015	86	
3	.101	86	
4	.101	86	
5	.005	86	
6	.005	86	
7			
8			
2-1			
2			
3			
4			
5			
6			
7			
8			
Averages :	.094	85.83	

Run 1-3 inlet

O2% :	CDAS	CO2% :	CDAS
H20% :	CDAS	measured / estimate	
Ps ("H2O) :	.02	Pb ("Hg) :	CDAS
Start Time :	1303	Stop Time :	13:08

Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.101	88	
2	.015	86	
3	.101	86	
4	.01	88	
5	.005	86	
6	.01	86	
7			
8			
2-1			
2			
3			
4			
5			
6			
7			
8			
Averages :	0.099	86.67	

Reviewers Signature :

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # : ETC-0305
Operator : Brendan Cohen
Facility : Rifle Bolton
Site :
Date : 10-7-10
Probe ID : P-498
Pitot Constant : .821

Points : 1 2 3 4 5 6 7 8 9 10 11 12

Stack Diameter (inches) : ~~40.5~~ 4
Upstream Disturbance (inches) : ~~30~~
Downstream Disturbance (inches) : ~~8~~
Schematic of Sampling Location :

Run # :	2-1 inlet	Run # :	2-2 inlet	Run # :	2-3 inlet
O2% :	CDAS	O2% :	CDAS	O2% :	CDAS
CO2% :	CDAS	CO2% :	CDAS	CO2% :	CDAS
H20% :	CDAS	H20% :	CDAS	H20% :	CDAS
measured / estimate		measured / estimate		measured / estimate	
Ps ("H2O) :	.03	Ps ("H2O) :	.025	Ps ("H2O) :	.025
Pb ("Hg) :	810	Pb ("Hg) :	8/0	Pb ("Hg) :	8/0
Start Time :	1410	Start Time :	1418	Start Time :	1430
Stop Time :	1414	Stop Time :	1424	Stop Time :	1435
Post Test Pitot Leak Check Good? :		Post Test Pitot Leak Check Good? :		Post Test Pitot Leak Check Good? :	

Point #	Delta P	Ts	Notes	Point #	Delta P	Ts	Notes	Point #	Delta P	Ts	Notes
1	.005	89		1	.005	89		1	.005	92	
2	.005	89		2	.005	89		2	.01	92	
3	.01	89		3	.01	89		3	.01	92	
4	.01	89		4	.01	89		4	.005	92	
5	.005	89		5	.005	89		5	.005	92	
6	.005	89		6	.005	89		6	.005	92	
Averages :	~~0.4594~~ 0.080	89		Averages :	0.080	89		Averages :	0.080	92	

Reviewers Signature :

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # : ETC-0305 | Operator : Brenda Cohen
Facility : Rifle Bolton | Site :
Date : 10-7-10
Probe ID : P498
Pilot Constant : 0.84 · 821

Points : 1 5 9 / 2 6 10 / 3 7 11 / 4 8 12

Stack Diameter (inches) : 4
Upstream Disturbance (inches) :
Downstream Disturbance (inches) :
Schematic of Sampling Location :

Run # : 3-1 inlet
O2% : CDAS | CO2% : CDAS
H20% : CDAS | measured / estimate
Ps ("H2O) : 10 3 | Pb ("Hg) : 810
Start Time : 1521 | Stop Time : 1526
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.005	92	
2	.005	92	
3	.01	92	
4	.01	92	
5	.01	92	
6	.01	92	
7			
8			
2-1			
2			
3			
4			
5			
6			
7			
8			
Averages :	.0902	92	

Run # : 3-2 inlet
O2% : CDAS | CO2% : CDAS
H20% : CDAS | measured / estimate
Ps ("H2O) : .03 | Pb ("Hg) : 810
Start Time : 1530 | Stop Time : 1538
Post Test Pilot Leak Check Good? : ✓

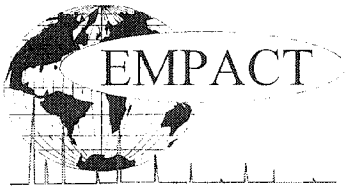
Point #	Delta P	Ts	Notes
1-1	.005	93	
2	.005	93	
3	.005	93	
4	.01	93	
5	.01	93	
6	.005	93	
7			
8			
2-1			
2			
3			
4			
5			
6			
7			
8			
Averages :	.08047	93	

Run # : 3-3 inlet
O2% : CDAS | CO2% : CDAS
H20% : CDAS | measured / estimate
Ps ("H2O) : .03 | Pb ("Hg) : 810
Start Time : 1540 | Stop Time : 1544
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.005	940	
2	.005	94	
3	.01	94	
4	.01	94	
5	.005	94	
6	.01	94	
7			
8			
2-1			
2			
3			
4			
5			
6			
7			
8			
Averages :	.08536	94	

Reviewers Signature :

Inlet Gas Analysis



NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**13**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 20, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 7, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	0505
NAME/DESCRIP :	ETC0305.RB.1A; RIFLE BOULTON		

FIELD DATA

SAMPLED BY :	DANE	SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	SPOT		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.00	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	0.65	-	-
NITROGEN	3.20	-	-
CO2	3.41	-	-
METHANE	78.69	-	-
ETHANE	7.75	2.061	2.072
PROPANE	1.62	0.444	0.446
ISOBUTANE	0.70	0.228	0.229
N-BUTANE	0.88	0.276	0.277
ISOPENTANE	0.37	0.135	0.135
N-PENTANE	0.29	0.105	0.105
HEXANES+	2.44	1.053	1.059
TOTAL	100.00	4.302	4.323

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1176.3	1182.7
GROSS SATURATED REAL =	1155.7	1162.1

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) : 0.7601

COMPRESSIBILITY FACTOR : 0.99642

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS

EMPACT

NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**14**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 22, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 7, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	899
NAME/DESCRIP :	ETC 0305.RB.1B; 25A/18		

FIELD DATA

SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.00	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	12.51	-	-
NITROGEN	44.22	-	-
CO2	1.54	-	-
METHANE	34.94	-	-
ETHANE	3.43	0.912	0.917
PROPANE	0.72	0.197	0.198
ISOBUTANE	0.32	0.104	0.105
N-BUTANE	0.41	0.129	0.129
ISOPENTANE	0.18	0.065	0.066
N-PENTANE	0.14	0.050	0.051
HEXANES+	1.59	0.686	0.690
TOTAL	100.00	2.143	2.156

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	549.0	552.0
GROSS SATURATED REAL =	539.4	542.4

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	0.9042
COMPRESSIBILITY FACTOR :	0.99848

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS

EMPACT

NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**15**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 22, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 7, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	586
NAME/DESCRIP :	ETC 0305.RB.2A; 25A/18		

FIELD DATA

SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.00	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	0.91	-	-
NITROGEN	3.43	-	-
CO2	5.00	-	-
METHANE	81.05	-	-
ETHANE	2.67	0.710	0.714
PROPANE	2.33	0.638	0.642
ISOBUTANE	0.66	0.215	0.216
N-BUTANE	0.92	0.288	0.290
ISOPENTANE	0.40	0.145	0.146
N-PENTANE	0.31	0.112	0.112
HEXANES+	2.32	1.001	1.006
TOTAL	100.00	3.109	3.126

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1123.7	1129.8
GROSS SATURATED REAL =	1104.0	1110.2

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) : 0.7577

COMPRESSIBILITY FACTOR : 0.99661

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS

EMPACT

NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**16**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 20, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 7, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	036
NAME/DESCRIP :	ETC 0305.RB.2B; 25A/18		

FIELD DATA

SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.00	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	2.41	-	-
NITROGEN	8.82	-	-
CO2	4.59	-	-
METHANE	75.62	-	-
ETHANE	2.39	0.636	0.639
PROPANE	2.12	0.581	0.584
ISOBUTANE	0.59	0.192	0.193
N-BUTANE	0.81	0.254	0.255
ISOPENTANE	0.35	0.127	0.128
N-PENTANE	0.28	0.101	0.101
HEXANES+	2.02	0.872	0.876
TOTAL	100.00	2.763	2.776

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1033.7	1039.4
GROSS SATURATED REAL =	1015.6	1021.3

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	0.7684
COMPRESSIBILITY FACTOR :	0.99700

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS

EMPACT

NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**17**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 20, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 7, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	981
NAME/DESCRIP :	ETC 0305.4B.3AA; 25A/18		

FIELD DATA

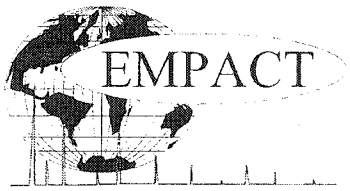
SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.00	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	1.68	-	-
NITROGEN	6.22	-	-
CO2	4.48	-	-
METHANE	78.02	-	-
ETHANE	2.13	0.566	0.569
PROPANE	2.55	0.699	0.702
ISOBUTANE	0.57	0.185	0.186
N-BUTANE	0.85	0.266	0.268
ISOPENTANE	0.40	0.145	0.146
N-PENTANE	0.31	0.112	0.112
HEXANES+	2.79	1.204	1.210
TOTAL	100.00	3.177	3.193

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1107.9	1114.0
GROSS SATURATED REAL =	1088.5	1094.6

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	0.7783
COMPRESSIBILITY FACTOR :	0.99661

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS



NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**18**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 20, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 7, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	1437
NAME/DESCRIP :	ETC 0305.RB.3BB; 25A/18		

FIELD DATA

SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.00	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	1.25	-	-
NITROGEN	4.89	-	-
CO2	4.62	-	-
METHANE	79.87	-	-
ETHANE	2.17	0.577	0.580
PROPANE	2.58	0.707	0.711
ISOBUTANE	0.58	0.189	0.190
N-BUTANE	0.85	0.266	0.268
ISOPENTANE	0.40	0.145	0.146
N-PENTANE	0.31	0.112	0.112
HEXANES+	2.48	1.070	1.076
TOTAL	100.00	3.066	3.083

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1112.5	1118.6
GROSS SATURATED REAL =	1093.0	1099.2

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) : 0.7639

COMPRESSIBILITY FACTOR : 0.99665

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS

Operating Data

Matt B. McGregor

From: Dane C. Murray
Sent: Wednesday, October 13, 2010 5:45 AM
To: Matt B. McGregor
Subject: FW: Rifle Boulton Dehy Data

From: Duletsky, Sam [mailto:Sam.Duletsky@energytransfer.com]
Sent: Monday, October 11, 2010 9:32 AM
To: Dane C. Murray
Subject: Rifle Boulton Dehy Data

Hi, Dane,

As we discussed, here is the dehy info for Rifle Boulton:

Hanover Dehy, 500,000 Btu/hr
S.N. 0505-155
Inlet pressure 792 psi, 81 degrees

Glycol Temp. = 355 degrees
Glycol pump is a Kimray 210 15 rated at 210 gal./hr.
Current strokes per minute = 11 per min., maximum rated at 32 strokes per minute

Contact tower = 64 degrees, 790 psi
Flash tank = 134 degrees, 38 psi

Gas throughput on testing day = 269.5 mscf

Sam Duletsky
ETC Canyon Pipeline
1950 Highway 6&50
Fruita, CO 81521

970-858-3425, ext. 80313
970-596-1161 (cell)

Greasewood Gas Plant Flare

Air Pollution Testing, Inc. : Analyzer Calibration Datasheet

Facility : Grease Wood	Date : 10-8-10
Location : Rio Blanco CO	APT Job # : ETC 0305
Unit : Flare	Page # :

Analyzer Information

Analyzer Type	O_2	CO_2	CH_4	NM		
Analyzer ID #	1420C-7	1415C-9	55I	55I		
Analyzer Scale	0-25	0-20	0-5000	0-5000		
Calibration Range	0-21.1	0-19.7	0-1500	0-84.5		

Calibration Gas Cylinder Information (Cylinder ID#/Expiration date and Concentration)

Analyzer Type	O_2	CO_2	CH_4	NM		
Zero	0	0	0	0		
CC#						
Expiration date						
Low			310	30		
CC#			ALM19994	ALM05-2218		
Expiration date			6-13	4-13		
Mid	10.0	10.1	759	50.1		
CC#	ALM017884		ALM016294	CC131241		
Expiration date	6-13		6-13	11-11		
High	21.1	19.7	1500	84.5		
CC#	ALM000243		ALM03634	CC10985-31		
Expiration date	4-13		6-13			

Calibration Error

Analyzer Type	O_2	CO_2	CH_4	NM		
Zero	0.0	0.0	0.8	0.0		
Low			306.5	30.6		
Mid	10.0	10.1	765.9	50.0		
High	21.1	19.7	1507.5	84.5		

Initial Bias Check

Run #: Start: Stop:

Analyzer Type	O_2	CO_2	CH_4	NM		
Zero	0.0	0.0	1.3	0.6		
Low						
Mid	9.9	10.2	805	39.6		
High						

Air Pollution Testing, Inc. : Analyzer Calibration Data Sheet

Facility : Grease wood | Date : 10-8-10
Location : Rio Blanco CO | APT Job # : ETC 0305
Unit : Flare | Page # :

Run # : 1 | Start Time 921 | Stop Time : 1021

Calibration Results

Analyzer Type	O2	CO2	CH4	Nm		
Zero	0.1	0.0	0.8	0.1		
Low						
Mid	10.0	10.1	311.0	31.1		
High						

Run # : 2 | Start Time : 10:41 | Stop Time : 11:41

Calibration Results

Analyzer Type	O2	CO2	CH4	Nm		
Zero	0.0	0.1	2.6	0.0		
Low						
Mid	10.0	10.0	311.8	30.6		
High						

Run # : 3 | Start Time : 1159 | Stop Time : 1259

Calibration Results

Analyzer Type	O2	CO2	CH4	Nm		
Zero	0.1	0.0	1.1	0.5		
Low						
Mid	10.0	10.0	308.7	30.3		
High						

Air Pollution Testing Inc. : EPA Method 2 - Pilot Traverse Datasheet

Job # : ETC 0305 | Operator : Brenden Cohen | Facility : Greenwood | Site : | Date : 10-8-10 | Probe ID : P-498 | Pilot Constant : ~~.84~~ .821

Points : 1 2 3 4 5 6 7 8 9 10 11 12

Stack Diameter (inches) :
Upstream Disturbance (inches) :
Downstream Disturbance (inches) :
Schematic of Sampling Location :

Run # : 1-1 out
O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : -.001 Pb ("Hg) : 779
Start Time : 9:25 Stop Time : 9:32
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.01	75	
2	.005	75	
3	.005	75	
4	.005	73	
5	.005	75	
6	.005	75	
7	.005	75	
8	.01	75	
2-1	.002	76	
2	.002	76	
3	.002	76	
4	.002	76	
5	.002	76	
6	.002	76	
7	.005	76	
8	.005	76	
Averages :	0.06	75.5	

Run # : 1-2 out
O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : -.001 Pb ("Hg) : 779
Start Time : 9:35 Stop Time : 9:42
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.01	77	
2	.01	77	
3	.005	77	
4	.003	77	
5	.002	77	
6	.002	77	
7	.002	77	
8	.005	77	
2-1	.002	78	
2	.002	78	
3	.002	78	
4	.002	78	
5	.005	78	
6	.002	78	
7	.002	78	
8	.005	78	
Averages :	.059	77.5	.0589 .059

Run # : 1-3 out
O2% : CDAS CO2% : CDAS
H20% : CDAS measured / estimate
Ps ("H2O) : -.001 Pb ("Hg) : 779
Start Time : 9:46 Stop Time : 9:54
Post Test Pilot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.01	79	
2	.005	79	
3	.005	79	
4	.003	79	
5	.002	79	
6	.002	80	
7	.005	80	
8	.005	80	
2-1	.002	79	
2	.002	79	
3	.002	79	
4	.002	80	
5	.002	80	
6	.002	80	
7	.002	80	
8	.005	80	
	.0603	79.5	
Averages :	.057	79.5	

Reviewers Signature :

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # : ETC 0305 | Operator : Brendan Cohen

Facility : Greenwood | Site :

Date : 10-8-16

Probe ID : P-498

Pilot Constant : ~~.81~~ .82

Points : 1 2 3 4 5 6 7 8 9 10 11 12

Stack Diameter (inches) :

Upstream Disturbance (inches) :

Downstream Disturbance (inches) :

Schematic of Sampling Location :

	Run # : 2-1 avt	Run # : 2-2 avt	Run # : 2-3 avt
O2% :	CDAS	CDAS	CDAS
CO2% :	CDAS	CDAS	CDAS
H20% :	CDAS measured / estimate	CDAS measured / estimate	CDAS measured / estimate
Ps ("H2O) :	-.001	-.001	-.001
Pb ("Hg) :	27.9	27.9	27.9
Start Time :	10:44	10:55	11:10
Stop Time :	10:52	11:07	11:20
Post Test Pitot Leak Check Good? :	✓	✓	✓

Point #	Delta P	Ts	Notes
1-1	.01	81	
2	.01	81	
3	.005	81	
4	.005	81	
5	.005	81	
6	.005	81	
7	.005	81	
8	.005	80	
2-1	.002	80	
2	.002	80	
3	.002	80	
4	.002	80	
5	.002	80	
6	.002	80	
7	.002	80	
8	.005	81	
Averages :	.063	80.5	

Point #	Delta P	Ts	Notes
1-1	.01	82	
2	.005	82	
3	.005	82	
4	.005	82	
5	.002	82	
6	.002	83	
7	.005	83	
8	.005	83	
2-1	.002	83	
2	.002	83	
3	.002	83	
4	.002	83	
5	.002	83	
6	.002	82	
7	.005	82	
8	.005	82	
		.0576	82
Averages :	0.059	82.5	

Point #	Delta P	Ts	Notes
1-1	.01	83	
2	.01	83	
3	.005	83	
4	.005	83	
5	.005	83	
6	.005	83	
7	.005	83	
8	.002	83	
2-1	.002	83	
2	.002	83	
3	.002	83	
4	.002	83	
5	.002	83	
6	.002	83	
7	.002	82	
8	.002	83	
Averages :	0.051	83	

Reviewers Signature :

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # : ETC 0305 | Operator : Brendan Cohen

Facility : Greenwood | Site :

Date : 10-8-10

Probe ID : P-498

Pitot Constant : ~~0.84~~ .821

Points : 1 2 3 4 5 6 7 8 9 10 11 12

Stack Diameter (inches) : 40.5

Upstream Disturbance (inches) : 30"

Downstream Disturbance (inches) : 8"

Schematic of Sampling Location :

Run # : 3-1 out

O2% : CDAS | CO2% : CDAS

H2O% : CDAS | measured / estimate

Ps ("H2O) : -.001 | Pb ("Hg) : 779

Start Time : 1200 | Stop Time : 1207

Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.005	85	
2	.005	85	
3	.01	85	
4	.005	85	
5	.005	85	
6	.005	85	
7	.002	85	
8	.002	85	
2-1	.002	90	
2	.002	91	
3	.002	92	
4	.002	92	
5	.005	92	
6	.005	92	
7	.002	92	
8	.002	92	
	.0596		
Averages :	0.60	88.31	

Run # : 3-2 out

O2% : CDAS | CO2% : CDAS

H2O% : CDAS | measured / estimate

Ps ("H2O) : -.001 | Pb ("Hg) : 779

Start Time : 1210 | Stop Time : 1217

Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.005	89	
2	.101	89	
3	.101	89	
4	.005	89	
5	.005	89	
6	.002	89	
7	.002	89	
8	.005	89	
2-1	.002	88	
2	.002	88	
3	.002	88	
4	.005	88	
5	.005	88	
6	.002	88	
7	.002	88	
8	.002	88	
	.0613	87.93	
Averages :	.0614	88.5	

Run # : 3-3 out

O2% : CDAS | CO2% : CDAS

H2O% : CDAS | measured / estimate

Ps ("H2O) : -.001 | Pb ("Hg) : 775

Start Time : 1220 | Stop Time : 1227

Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.001	84	
2	.01	88	
3	.01	88	
4	.005	87	
5	.002	87	
6	.002	87	
7	.005	87	
8	.005	87	
2-1	.005	86	
2	.002	86	
3	.002	86	
4	.005	87	
5	.002	87	
6	.002	87	
7	.002	87	
8	.002	86	
Averages :	0.0614	87	

Reviewers Signature :

Air Pollution Testing, Inc. : EPA M - Moisture Determination Datasheet

APT Job #: FTC-0305 | Date: 10/8/10 | CO2 (%): CPAS | O2 (%): CPAS

Location: Greasewood | Operator: Brendan Cohen | Ambient Temperature (oF): 70° | Barometric Pressure (mbar): 779

Run #: 1 (outlet) | Meter Box ID: MS-10 | Probe Length (ft): 25 | Moisture (grams): 12.6

Meter Box Yd: .980 | Meter DH@: 1.71 | Static Pressure (" H2O): | Start Time: 9:21

Pre-Test Pump Leak Check: 0.02@10" | Post-Test Pump Leak Check: 0.02@10" | Method: 4 | Stop Time: 10:21

Sampling Time (minutes)	Vacuum (" Hg)	Orifice Setting (" H2O)	Meter Temp. Inlet (oF)	Meter Temp. Outlet (oF)	Condenser Temp. (oF)	Meter Volume (ft3) Initial Volume	Notes
						965.825	
5	2	1.0	52	53	31	969.81	
10	2	1.0	52	53	31	973.71	
15	2	1.0	52	53	31	977.50	
20	2	1.0	53	55	31	981.39	
25	2	1.0	53	55	31	985.35	
30	2	1.0	53	53	31	989.18	
35	2	1.0	53	55	31	993.11	
40	2	1.0	54	55	31	996.96	
45	2	1.0	54	55	31	1000.865	
50	2	1.0	59	55	32	1004.96	
55	2	1.0	59	55	32	1007.72	
60	2	1.0	59	55	32	1011.368	
total	readings	average	average	average	maximum	difference	
60	2	1.0	53.8	31.25	45.953		

Sosmatic of Stack:

Stack ID (inches):

Upstream Disturbance (inches):

Downstream Disturbance (inches):

Moisture Determination

Imp. #	Tare	Final	Gain
1	410.1	398.9	+11.2
2	439.5	451.2	+11.7
3	303.5	307.5	+4.0
4	450.8	458.9	+8.1
		Total	12.6

Reviewers Signature

Air Pollution Testing, Inc. : EPA M... - Moisture Determination Datasheet

APT Job #: ETC0305 | Date: 10-8-10

Location: Greasewood | Operator: Brenda Cohen

Run #: 2 (outlet) | Meter Box ID: MS-10

Meter Box Yd: ~~0.5~~ 0.980 | Meter DH@: 1.71

Pre-Test Pump Leak Check: 0.000 @ 10"Hg | Post-Test Pump Leak Check: 0.000 @ 10"Hg

CO2(%): CRAS | O2(%): CRAS

Ambient Temperature (oF): 55 | Barometric Pressure (mbar): 779

Probe Length (ft): 27 | Moisture (grams): 8.1

Static Pressure (" H2O): CNX | Start Time: 10:41

Method: 4 | Stop Time: 11:41

Sampling Time (minutes)	Vacuum (" Hg)	Orifice Setting (" H2O)	Meter Temp. Inlet (oF)	Meter Temp. Outlet (oF)	Condenser Temp. (oF)	Meter Volume (ft3) Initial Volume	Notes
						11.418	
5	1	1.0	51	~~53~~	33	14.95	
10	1	1.0	52	~~54~~	33	18.50	
5	1	1.0	52	56	33	22.02	
20	1	1.0	52	56	32	25.55	
25	1	1.0	54	58	32	29.11	
30	1	1.0	59	58	32	32.62	
35	1	1.0	55	59	32	36.15	
40	1	1.0	55	59	33	39.70	
45	1	1.0	56	60	33	43.211	
50	1	1.0	56	60	37	~~43.211~~ 46.76	
55	1	1.0	56	60	33	51.400	
60	1	1.0	56	60	33	53.931	
total	maximum	average	average	minimum	difference		
60	1	1.0	52.54	32.67	42.513		

Schematic of Stack:

Stack ID (inches): 40.0

Upstream Disturbance (inches): 30

Downstream Disturbance (inches): 8

Moisture Determination

Imp. #	Tare	Final	Gain
1	398.9	407.0	+8.1
2	451.2	441.2	+10.0
3	307.5	309.4	+1.9
4	458.9	464.0	+5.1
		Total	5.1

Reviewer Signature

Air Pollution Testing, Inc. : EPA M[illegible] - Moisture Determination Datasheet

APT Job #: ETC 0305 | Date: 10-8-10

Location: Greasewood | Operator: Brenda Cohen

Run #: 3 (outlet) | Meter Box ID: M5-10

Meter Box Yd: 0.980 | Meter DH@: 1.71

Pre-Test Pump Leak Check: 0.000@10"Hg | Post-Test Pump Leak Check: 0.000@10"Hg

CO2(%): 0.0 | O2 (%): 0.0

Ambient Temperature (oF): | Barometric Pressure (mbar): 771

Probe Length (ft): 24 | Moisture (psms): 0.0

Static Pressure (" H2O): 0.0 | Start Time: 11:59

Method: 4 | Stop Time: 12:59

Sampling Time (minutes)	Vacuum (" Hg)	Orifice Setting (" H2O)	Meter Temp. Inlet (oF)	Meter Temp. Outlet (oF)	Condenser Temp. (oF)	Meter Volume (ft3) Initial Volume	Notes
						54.024	
5	1	1.0	56	57	33	57.51	
10	1	1.0	56	59	33	~~60.~~	61.009
15	1	1.0	56	60	33	64.49	
20	1	1.0	57	62	33	67.98	
25	1	1.0	58	63	33	71.47	
30	1	1.0	58	63	33	74.968	
35	1	1.0	58	63	33	78.49	
40	1	1.0	58	63	33	81.93	
45	1	1.0	58	63	33	85.41	
50	1	1.0	59	64	33	88.89	
55	1	1.0	59	64	33	92.38	
60	1	1.0	59	64	33	95.862	
					33		
total	maximum	average	average	maximum	difference		
60	1	1.0	59.86		41.838		

Schematic of Stack:

Stack ID (inches): 40.5

Upstream Disturbance (inches): 30"

Downstream Disturbance (inches): 8"

Moisture Determination

Imp. #	Tare	Final	Gain
1	402.1	396.1	-6
2	441.2	452.2	11
3	309.4	309.8	1/2
4	464.0	466.6	2.6
		Total	8.0

Reviewer Signature:

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # : ETC 0305 | Operator : Brendan Cohen

Facility : Greenwood | Site :

Date : 10-8-10

Probe ID : P-498

Pilot Constant : .84 .821

Points : 1 5 9 / 2 6 10 / 3 7 11 / 4 8 12

Stack Diameter (inches) : 4

Upstream Disturbance (inches) :

Downstream Disturbance (inches) :

Schematic of Sampling Location :

Run 1-1 in

O2% : CDAS CO2% : CDAS

H2O% : CDAS measured / estimate

Ps ("H2O) : +.012 Pb ("Hg) : 29.79

Start Time : 10:00 Stop Time : 10:05

Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.002	56	
2	.002	56	
3	.002	56	
4	.001	56	
5	.002	56	
6	.002	56	
7	~~.002~~		
8	.		
Averages :	.043	56	

Run 1-2 in

O2% : CDAS CO2% : CDAS

H2O% : CDAS measured / estimate

Ps ("H2O) : +.012 Pb ("Hg) : 29.79

Start Time : 10:08 Stop Time : 10:14

Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.002	56	
2	.002	56	
3	.001	56	
4	.002	56	
5	.002	56	
6	.001	56	
7			
8			
Averages :	.040	55	

Run 1-3 in

O2% : CDAS CO2% : CDAS

H2O% : CDAS measured / estimate

Ps ("H2O) : +.012 Pb ("Hg) : 29.79

Start Time : 10:18 Stop Time : 10:22

Post Test Pitot Leak Check Good? : ✓

Point #	Delta P	Ts	Notes
1-1	.001	57	
2	.002	57	
3	.002	57	
4	M 0.002	57	
5	.002	57	
6	.001	57	
7			
8			
Averages :	.040	57	

Reviewers Signature :

Air Pollution Testing Inc. : EPA Method 2 - Pitot Traverse Datasheet

Job # : ETC 0305
Facility : Greasewood
Date : 10-8-10
Probe ID : P-498
Pitot Constant : ~~.84~~ .821 ✓

Operator : Brendan Cohen
Site :
Points : 1 2 3 4 5 6 7 8 9 10 11 12

Stack Diameter (inches) : ~~40.5~~ 4
Upstream Disturbance (inches) : ~~30~~
Downstream Disturbance (inches) : ~~8"~~
Schematic of Sampling Location :

Run # :	2-1 in			Run # :	2-2 in			Run # :	2-3 in		
O2% :	CDAS	CO2% :	CDAS	O2% :	CDAS	CO2% :	CDAS	O2% :	CDAS	CO2% :	CDAS
H2O% :	CDAS	measured / estimate		H2O% :	CDAS	measured / estimate		H2O% :	CDAS	measured / estimate	
Ps ("H2O) :	+.015	Pb ("Hg) :	779	Ps ("H2O) :	+.02	Pb ("Hg) :	779	Ps ("H2O) :	+.02	Pb ("Hg) :	779
Start Time :	11:25	Stop Time :	11:30	Start Time :	11:33	Stop Time :	11:37	Start Time :	11:40	Stop Time :	11:44
Post Test Pitot Leak Check Good? :	✓			Post Test Pitot Leak Check Good?	✓			Post Test Pitot Leak Check Good? :	✓		
Point #	Delta P	Ts	Notes	Point #	Delta P	Ts	Notes	Point #	Delta P	Ts	Notes
1	.002	68		1	.002	69		1	.002	70	
2	.002	68		2	.002	69		2	.002	70	
3	.001	68		3	.001	69		3	.003	70	
4	.002	68		4	.001	69		4	.001	70	
5	.003	68		5	.002	69		5	.002	70	
6	.002	68		6	.002	69		6	.002	70	
Averages :	0.044	68		Averages :	.040	69		Averages :	0.044	70	

Reviewers Signature :

Air Pollution Testing Inc. : EPA Method 2 - Pilot Traverse Datasheet

Job # : ETC-0305 | Operator : Brendon Cohen

Facility : Greenwood | Site :

Date : 10-8-10

Probe ID : P-498

Pilot Constant : ~~.85~~ .821 ✓

Points : 1 2 3 4 5 6 7 8 9 10 11 12

Stack Diameter (inches) : ~~40.5~~ 4

Upstream Disturbance (inches) : 30"

Downstream Disturbance (inches) : ~~5~~"

Schematic of Sampling Location :

Run # : 3-1 ✓		Run # : 3-2 ✓		Run # : 3-3 ✓	
O2% : CDAS	CO2% : CDAS	O2% : CDAS	CO2% : CDAS	O2% : CDAS	CO2% : CDAS
H20% : CDAS	measured / estimate	H20% : CDAS	measured / estimate	H20% : CDAS	measured / estimate
Ps ("H2O) : +.015	Pb ("Hg) : 29.79	Ps ("H2O) : +.015	Pb ("Hg) : 29.79	Ps ("H2O) : .015	Pb ("Hg) : 29.79
Start Time : ~~1230~~ 1230	Stop Time : 1234	Start Time : 1237	Stop Time : 1241	Start Time : 1245	Stop Time : 1250
Post Test Pilot Leak Check Good? : ✓		Post Test Pilot Leak Check Good? : ✓		Post Test Pilot Leak Check Good? : ✓	

Point #	Delta P	Ts	Notes
1	.002	~~70~~	
2	.002	70	
3	.003	70	
4	.002	70	
5	.002	70	
6	.001	70	
Averages :	.044	70	

Point #	Delta P	Ts	Notes
1	.002	~~70~~	
2	.002	70	
3	.002	70	
4	.002	70	
5	.003	70	
6	.001	70	
Averages :	.044	70	

Point #	Delta P	Ts	Notes
1	.002	~~70~~	
2	.001	70	
3	.001	70	
4	.001	70	
5	.002	70	
6	.001	70	
Averages :	.036	70	

Reviewers Signature :

Inlet Gas Analysis

Glenwood 10-8-10

Contact tower - 710 psi
68 °F

Test was on 10/4/2010

Flash tank 32 psi
114 °F

Reboil 375 °F
f 3.5 psi

~~1.2~~ MMscf/day
1.8

EMPACT

NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**19**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 20, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 8, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	898
NAME/DESCRIP :	ETC 0305.GW.1A; 25A/18 @ 10:15		

FIELD DATA

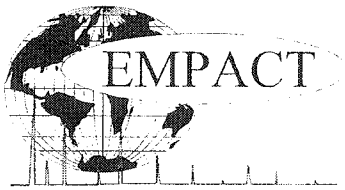
SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.00	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	21.97	-	-
NITROGEN	77.96	-	-
CO2	0.05	-	-
METHANE	0.02	-	-
ETHANE	0.00	0.000	0.000
PROPANE	0.00	0.000	0.000
ISOBUTANE	0.00	0.000	0.000
N-BUTANE	0.00	0.000	0.000
ISOPENTANE	0.00	0.000	0.000
N-PENTANE	0.00	0.000	0.000
HEXANES+	0.00	0.000	0.000
TOTAL	100.00	0.000	0.000

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	0.2	0.2
GROSS SATURATED REAL =	0.2	0.2

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	0.9976
COMPRESSIBILITY FACTOR :	0.99963

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS



NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**20**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 20, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 8, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	733
NAME/DESCRIP :	ETC 0305.GW.1B		

FIELD DATA

SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :			

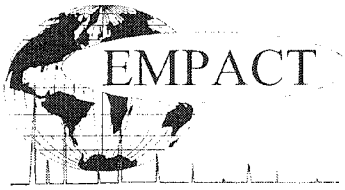
COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.00	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	22.02	-	-
NITROGEN	77.84	-	-
CO2	0.04	-	-
METHANE	0.08	-	-
ETHANE	0.01	0.003	0.003
PROPANE	0.01	0.003	0.003
ISOBUTANE	0.00	0.000	0.000
N-BUTANE	0.00	0.000	0.000
ISOPENTANE	0.00	0.000	0.000
N-PENTANE	0.00	0.000	0.000
HEXANES+	0.00	0.000	0.000
TOTAL	100.00	0.006	0.006

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1.2	1.2
GROSS SATURATED REAL =	1.2	1.2

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) : 0.9975

COMPRESSIBILITY FACTOR : 0.99963

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS



NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**21**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 20, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 8, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	951
NAME/DESCRIP :	ETC 0305.GWP.2A; 25A/18 @ 11:30		

FIELD DATA

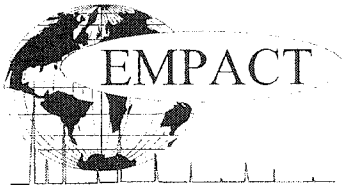
SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.00	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	21.95	-	-
NITROGEN	77.81	-	-
CO2	0.07	-	-
METHANE	0.17	-	-
ETHANE	0.00	0.000	0.000
PROPANE	0.00	0.000	0.000
ISOBUTANE	0.00	0.000	0.000
N-BUTANE	0.00	0.000	0.000
ISOPENTANE	0.00	0.000	0.000
N-PENTANE	0.00	0.000	0.000
HEXANES+	0.00	0.000	0.000
TOTAL	100.00	0.000	0.000

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	1.7	1.7
GROSS SATURATED REAL =	1.7	1.7

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	0.9971
COMPRESSIBILITY FACTOR :	0.99963

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS



NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**22**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 21, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 8, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	1202
NAME/DESCRIP :	ETC 0305.GWP.2B; 25A/18 @ 11:35		

FIELD DATA

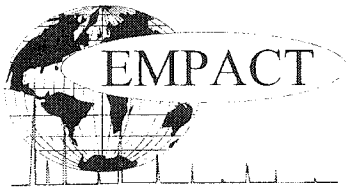
SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.01	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	22.01	-	-
NITROGEN	77.90	-	-
CO2	0.04	-	-
METHANE	0.04	-	-
ETHANE	0.00	0.000	0.000
PROPANE	0.00	0.000	0.000
ISOBUTANE	0.00	0.000	0.000
N-BUTANE	0.00	0.000	0.000
ISOPENTANE	0.00	0.000	0.000
N-PENTANE	0.00	0.000	0.000
HEXANES+	0.00	0.000	0.000
TOTAL	100.00	0.000	0.000

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	0.4	0.4
GROSS SATURATED REAL =	0.4	0.4

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	0.9974
COMPRESSIBILITY FACTOR :	0.99963

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS



NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**23**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 21, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 8, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	1021
NAME/DESCRIP :	ETC 0305.GWP.3A; 25A/18 @ 12:40		

FIELD DATA

SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.00	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	21.99	-	-
NITROGEN	77.95	-	-
CO2	0.06	-	-
METHANE	0.00	-	-
ETHANE	0.00	0.000	0.000
PROPANE	0.00	0.000	0.000
ISOBUTANE	0.00	0.000	0.000
N-BUTANE	0.00	0.000	0.000
ISOPENTANE	0.00	0.000	0.000
N-PENTANE	0.00	0.000	0.000
HEXANES+	0.00	0.000	0.000
TOTAL	100.00	0.000	0.000

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	0.0	0.0
GROSS SATURATED REAL =	0.0	0.0

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	0.9977
COMPRESSIBILITY FACTOR :	0.99963

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS

EMPACT

NATURAL GAS ANALYSIS

PROJECT NO. :	**201010075**	ANALYSIS NO. :	**24**
COMPANY NAME :	**AIR POLLUTION TESTING**	ANALYSIS DATE:	OCTOBER 21, 2010
ACCOUNT NO. :	ETC 0305	SAMPLE DATE :	OCTOBER 8, 2010
PRODUCER :		TO:	
LEASE NO. :		CYLINDER NO. :	829
NAME/DESCRIP :	ETC 0305.GWP.3B; 25A/18 @ 12:50		

FIELD DATA

SAMPLED BY :		SAMPLE TEMP. :	
SAMPLE PRES. :		AMBIENT TEMP.:	
COMMENTS :	AIR CAN		

COMPONENTS	NORM. MOLE%	GPM @ **14.65**	GPM @ **14.73**
HELIUM	0.00	-	-
HYDROGEN	0.00	-	-
OXYGEN/ARGON	22.00	-	-
NITROGEN	77.90	-	-
CO2	0.06	-	-
METHANE	0.03	-	-
ETHANE	0.01	0.003	0.003
PROPANE	0.00	0.000	0.000
ISOBUTANE	0.00	0.000	0.000
N-BUTANE	0.00	0.000	0.000
ISOPENTANE	0.00	0.000	0.000
N-PENTANE	0.00	0.000	0.000
HEXANES+	0.00	0.000	0.000
TOTAL	100.00	0.003	0.003

BTU @ 60 DEG F	**14.65**	**14.73**
GROSS DRY REAL =	0.5	0.5
GROSS SATURATED REAL =	0.5	0.5

RELATIVE DENSITY (AIR=1 @14.696 PSIA 60F) :	0.9977
COMPRESSIBILITY FACTOR :	0.99963

NOTE: REFERENCE GPA 2261(ASTM D1945 & ASME-PTC), 2145, & 2172 CURRENT PUBLICATIONS

Operating Data

Appendix 3

Calibration Data and Certificates

Environmental Supply Company, Inc.
Quality Source Sampling Systems & Accessories

Wind Tunnel Pitot Calibration

S-type Pitot ID:	**P-498**	Date:	**28-Jan-10**
Standard Pitot ID:	**001**	Personnel:	**DH**
Cp(std):	**0.99**	Cp(actual):	**0.821**
Part Number:		P(bar):	**29.91**
Test Velocity (fps):	**50**	T(°F):	**50**

A-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.585	**0.855**	**0.819**	0.001
0.581	**0.858**	**0.815**	-0.004
0.583	**0.850**	**0.820**	0.002
0.583	**0.853**	**0.819**	0.001
	AVERAGE	**0.818**	0.002
		Std deviation	0.002

B-SIDE

ΔP_{std} (in. H_2O)	ΔP_s (in. H_2O)	Cp(s)	Deviation*
0.584	**0.839**	**0.826**	0.001
0.582	**0.838**	**0.825**	0.000
0.583	**0.845**	**0.822**	-0.002
0.581	**0.836**	**0.825**	0.001
	AVERAGE	**0.825**	0.001
		Std deviation	0.002

$$Cp(s) = Cp(std)\sqrt{\frac{\Delta P(std)}{\Delta P(s)}}$$

Cp(A) - Cp(B) = 0.007 {must be <0.010}

*Deviation = {Cp(s) - *AVG* Cp(s)} {must be <0.010}

Standard deviation of the deviations must be less than 0.02 for both

Pitot tube S/N P-498 was calibrated in accordance with the CFR 40, Part 60 Appendix A, Method 2, Section 10.

Signature

01/28/10
Date

2142 E. Geer Street, Durham, North Carolina 27704 www.environsupply.com 919-956-9688 FAX: 919-682-0333

AIR
POLLUTION
TESTING, INC.
DENVER, DURANGO, SALT LAKE CITY

AIR POLLUTION TESTING, INC.
THERMOCOUPLE AND DRY GAS METER CALIBRATION DATA

GAS METER ID :	M5-10 Pre
DATE :	24-Jun-10
BARO. PRESS. (MBAR) :	840

GAS METER CALIBRATION

Run #1	DH	Vmet	Tin	Tout	Vref	Tref	DP	Vac	Time
Start	0.5	726.929	75	75	599.176	76	0.34	1	10:13 AM
Stop	0.5	736.294	76	78	608.431	78	0.34	1	10:33 AM
Avg.	**0.5**	**9.365**	**76**	**77**	**9.255**	**77**	**0.34**	**1**	**20.0**

Run #2	DH	Vmet	Tin	Tout	Vref	Tref	DP	Vac	Time
Start	1.5	736.294	76	78	608.431	78	0.79	5	10:40 AM
Stop	1.5	748.116	78	86	620.113	81	0.79	5	10:55 AM
Avg.	**1.5**	**11.822**	**77**	**82**	**11.682**	**80**	**0.79**	**5**	**15.0**

Run #3	DH	Vmet	Tin	Tout	Vref	Tref	DP	Vac	Time
Start	3.0	749.254	79	82	621.483	81	1.4	8	11:03 AM
Stop	3.0	760.13	80	83	632.442	82	1.4	8	11:13 AM
Avg.	**3.0**	**10.876**	**80**	**83**	**10.959**	**82**	**1.40**	**8**	**10.0**

	Run #1	Run #2	Run #3	*Average*
Yref	0.994	0.994	0.994	***0.994***
Yd	0.978	0.976	0.988	***0.980***
DH@	1.63	1.73	1.76	***1.71***

THERMOCOUPLE CALIBRATION

Calibration Temperature Reading (F)	Pyrometer Reading (F)	ABS (Relative Difference) % R
0	1	0.2
50	49	0.2
100	99	0.2
150	150	0.0
250	251	0.1
500	498	0.2
800	801	0.1
Max Absolute Difference %		0.2

PITOT LEAK CHECK

0.00 @ 6" H2O Positive	x
0.00 @ 6" H2O Negative	x

Technician: ACB

DENVER OFFICE
5530 Marshall Street
Arvada, CO 80002
(303) 420-5949
FAX (303) 420-5920
(800) 268-6213

METHOD 5 DRY GAS METER CALIBRATION USING CRITICAL ORIFICES

Quality - Service - Reliability

ENVIRONMENTAL

1) Select three critical orifices to calibrate the dry gas meter which bracket the expected operating range.
2) Record barometric pressure before and after calibration procedure.
3) Run at tested vacuum (from Orifice Calibration Report), for a period of time necessary to achieve a minimum total volume of 5 cubic feet.
4) Record data and information in the **GREEN** cells, YELLOW cells are calculated.

					INITIAL	FINAL	AVG (P_{bar})
DATE:	10/12/2010	METER SERIAL #:	na	BAROMETRIC PRESSURE (in Hg):	25.17	25.17	25.16808
METER PART #:	m5-10	CRITICAL ORIFICE SET SERIAL #:	1527s	(mmbar)	852		

ORIFICE #	RUN #	K' FACTOR (AVG)	TESTED VACUUM (in Hg)	DGM READINGS (FT^3) INITIAL	DGM READINGS (FT^3) FINAL	DGM READINGS (FT^3) NET (V_m)	TEMPERATURES °F AMBIENT	DGM INLET INITIAL	DGM INLET FINAL	DGM OUTLET INITIAL	DGM OUTLET FINAL	DGM AVG	ELAPSED TIME (MIN) θ	DGM ΔH (in H_2O)	Y	Y % Diff to Average Y	$\Delta H_@$
18	1	0.5069	15	99.783	106.014	6.231	67	62	63	62	64	62.75	10.00	1.1	1.046		1.71
	2	0.5069	15	106.014	113.265	7.251	67	63	64	64	66	64.25	10.00	1.1	0.902		1.70
	3	0.5069	15	113.265	119.841	6.576	67	64	64	66	67	65.25	10.00	1.1	0.996		1.70
					20.058										0.982	0.16	

USING THE CRITICAL ORIFICES AS CALIBRATION STANDARDS:

The following equations are used to calculate the standard volumes of air passed through the DGM, V_m (std), and the critical orifice, V_{cr} (std), and the DGM calibration factor, Y. These equations are automatically calculated in the spreadsheet above.

0.980

1.71

$\Delta H \left(\frac{V_m(std)}{V_{m}} \right)$

(1) $$Vm_{(std)} = K_1 * Vm * \frac{Pbar + (\Delta H / 13.6)}{Tm}$$

= Net volume of gas sample passed through DGM, corrected to standard conditions

K_1 =

T_m =

(2) $$Vcr_{(std)} = K' * \frac{Pbar * \Theta}{\sqrt{Tamb}}$$

= Volume of gas sample passed through the critical orifice, corrected to standard conditions

T_{amb} = Absolute ambient temperature (°R - English, °K - Metric)

K' = Average K' factor from Critical Orifice Calibration

(3) $$Y = \frac{Vcr_{(std)}}{Vm_{(std)}}$$

= DGM calibration factor

AIR LIQUIDE SPECIALTY GASES Scott

500 WEAVER PARK RD, LONGMONT, CO 80501 Phone: 888-253-1635 Fax: 303-772-7673

RATA CLASS

Dual-Analyzed Calibration Standard

CERTIFICATE OF ACCURACY: Interference Free™ Multi-Component EPA Protocol Gas

Assay Laboratory
AIR LIQUIDE AMERICA SPECIALTY GASES LLC
500 WEAVER PARK RD
LONGMONT, CO 80501

P.O. No.: D0OFC
Project No.: 08-89934-006

Customer
AIR POLLUTION TESTING INC
JOHN MILLER
5530 MARSHALL STREET
ARVADA CO 80002

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM017884 **Certification Date:** 17Jun2010 **Exp. Date:** 16Jun2013
Cylinder Pressure*:** 2015 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
CARBON DIOXIDE	10.1 %	+/- 1%	Direct NIST and VSL
OXYGEN	10.0 %	+/- 1%	
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1675	02Oct2012	K012067	13.93 %	CARBON DIOXIDE
NTRM 2658	02Oct2010	ALM065029	9.930 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR//1602651	14Jun2010	FTIR
OXYMAT/6E/W5-951	28May2010	PARAMAGNETIC

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

First Triad Analysis
CARBON DIOXIDE
Date: 16Jun2010 Response Unit: %
Z1=-0.00166 R1=13.86853 T1=10.05251
R2=13.88164 Z2=-0.00048 T2=10.06386
Z3=0.00221 T3=10.07651 R3=13.90303
Avg. Concentration: 10.10 %
OXYGEN
Date: 17Jun2010 Response Unit: AREA
Z1=0.00000 R1=9.94300 T1=10.09000
R2=9.94100 Z2=0.00000 T2=10.09000
Z3=0.00000 T3=10.08000 R3=9.94000
Avg. Concentration: 10.04 %

Second Triad Analysis

Calibration Curve
Concentration=A+Bx+Cx2+Dx3+Ex4
r=9.99992E-1
Constants: A=0.00000E+0
B=6.42999E-1 C=4.99900E-3
D=0.00000E+0 E=0.00000E+0

Concentration=A+Bx+Cx2+Dx3+Ex4
r=0.999998
Constants: A=-0.02746038
B=0.99864554 C=
D= E=

QUALITY ASSURANCE

APPROVED BY: ADAM HANLEY
(signature on file)

500 WEAVER PARK RD, LONGMONT, CO 80501 Phone: 888-253-1635 Fax: 303-772-7673

RATA CLASS

Dual-Analyzed Calibration Standard

CERTIFICATE OF ACCURACY: Interference Free™ Multi-Component EPA Protocol Gas

Assay Laboratory
AIR LIQUIDE AMERICA SPECIALTY GASES LLC
500 WEAVER PARK RD
LONGMONT, CO 80501

P.O. No.: D0OFC
Project No.: 08-87900-002

Customer
AIR POLLUTION TESTING INC

5530 MARSHALL STREET
ARVADA CO 80002

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM000245 **Certification Date:** 26Apr2010 **Exp. Date:** 25Apr2013
Cylinder Pressure***: 2015 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
CARBON DIOXIDE	19.7 %	+/- 1%	Direct NIST and VSL
OXYGEN	21.1 %	+/- 1%	
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1675	02Oct2012	K012067	13.93 %	CARBON DIOXIDE
NTRM 2350	01Dec2011	K017995	23.20 %	OXYGEN

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
FTIR//1602651	16Apr2010	FTIR
OXYMAT/6E/W5-951	26Apr2010	PARAMAGNETIC

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

First Triad Analysis
CARBON DIOXIDE
Date: 24Apr2010 Response Unit: %
Z1=-0.00255 R1=13.89503 T1=19.67026
R2=13.90329 Z2=-0.00145 T2=19.68371
Z3=0.00053 T3=19.69015 R3=13.93421
Avg. Concentration: 19.71 %

OXYGEN
Date: 26Apr2010 Response Unit: VOLTS
Z1=0.00000 R1=23.26000 T1=21.15000
R2=23.25000 Z2=0.00000 T2=21.18000
Z3=0.00000 T3=21.16000 R3=23.26000
Avg. Concentration: 21.13 %

Second Triad Analysis

Calibration Curve

Concentration=A+Bx+Cx2+Dx3+Ex4
r=9.99992E-1
Constants: A=0.00000E+0
B=7.75974E-1 C=7.99200E-3
D=0.00000E+0 E=0.00000E+0

Concentration=A+Bx+Cx2+Dx3+Ex4
r=0.999999
Constants: A=-0.01985233
B=0.999350024 C=
D= E=

QUALITY ASSURANCE

APPROVED BY: ADAM HANLEY
(signature on file)

500 WEAVER PARK RD, LONGMONT, CO 80501 Phone: 888-253-1635 Fax: 303-772-7673

COMPLIANCE CLASS

Dual-Analyzed Calibration Standard

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory
AIR LIQUIDE AMERICA SPECIALTY GASES LLC
500 WEAVER PARK RD
LONGMONT, CO 80501

P.O. No.: D0OFC
Project No.: 08-89388-003

Customer
AIR POLLUTION TESTING INC
JOHN MILLER
5530 MARSHALL STREET
ARVADA CO 80002

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: AAL19994 **Certification Date:** 10Jun2010 **Exp. Date:** 09Jun2013
Cylinder Pressure***: 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
METHANE	310 PPM	+/- 2%	NIST and VSL
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol procedures , September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2750	02Oct2011	ALM048818	49.80 PPM	METHANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HP/6890/US00006537	10Jun2010	FID

QUALITY ASSURANCE

APPROVED BY: SAM BENNETT
(signature on file)

500 WEAVER PARK RD. LONGMONT, CO 80501 Phone: 888-253-1635 Fax: 303-772-7673

COMPLIANCE CLASS

Dual-Analyzed Calibration Standard

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory
AIR LIQUIDE AMERICA SPECIALTY GASES LLC
500 WEAVER PARK RD
LONGMONT, CO 80501

P.O. No.: D0OFC
Project No.: 08-89388-002

Customer
AIR POLLUTION TESTING INC
JOHN MILLER
5530 MARSHALL STREET
ARVADA CO 80002

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM061294 **Certification Date:** 10Jun2010 **Exp. Date:** 09Jun2013
Cylinder Pressure***: 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
METHANE	759 PPM	+/- 2%	NIST and VSL
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol procedures , September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2750	02Oct2011	ALM048818	49.80 PPM	METHANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HP/6890/US00006537	10Jun2010	FID

QUALITY ASSURANCE

APPROVED BY: SAM BENNETT
(signature on file)

500 WEAVER PARK RD, LONGMONT, CO 80501 Phone: 888-253-1635 Fax: 303-772-7673

COMPLIANCE CLASS

Dual-Analyzed Calibration Standard

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory
AIR LIQUIDE AMERICA SPECIALTY GASES LLC
500 WEAVER PARK RD
LONGMONT, CO 80501

P.O. No.: D0OFC
Project No.: 08-89388-001

Customer
AIR POLLUTION TESTING INC
JOHN MILLER
5530 MARSHALL STREET
ARVADA CO 80002

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM036340 **Certification Date:** 10Jun2010 **Exp. Date:** 09Jun2013
Cylinder Pressure*:** 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
METHANE	1,500 PPM	+/- 2%	NIST and VSL
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol procedures , September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 2750	02Oct2011	ALM048818	49.80 PPM	METHANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HP/6890/US00006537	10Jun2010	FID

QUALITY ASSURANCE

APPROVED BY: SAM BENNETT
(signature on file)

500 WEAVER PARK RD, LONGMONT, CO 80501 Phone: 888-253-1635 Fax: 303-772-7673

RATA CLASS

Dual-Analyzed Calibration Standard

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory
AIR LIQUIDE AMERICA SPECIALTY GASES LLC
500 WEAVER PARK RD
LONGMONT, CO 80501

P.O. No.: D0OFC
Project No.: 08-87157-003

Customer
AIR POLLUTION TESTING INC

5530 MARSHALL STREET
ARVADA CO 80002

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM052218
Cylinder Pressure***: 2000 PSIG

Certification Date: 08Apr2010

Exp. Date: 07Apr2013

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
PROPANE	30.0 PPM	+/- 1%	Direct NIST and VSL
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1667	02Oct2012	ALM036360	49.80 PPM	PROPANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HP/6890/US00034440	08Apr2010	TCD/FID

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

First Triad Analysis
PROPANE
Date: 08Apr2010 Response Unit: AREA
Z1=0.00000 R1=221583.0 T1=134455.0
R2=221836.0 Z2=0.00000 T2=134578.0
Z3=0.00000 T3=134558.0 R3=222495.0
Avg. Concentration: 30.04 PPM

Second Triad Analysis

Calibration Curve
Concentration=A+Bx+Cx2+Dx3+Ex4
r=0.999998
Constants: A=-0.3528476
B=0.00022558 C=
D= E=

QUALITY ASSURANCE

APPROVED BY: JOHN ROZOF
(signature on file)

Spectra Gases Inc.

3434 Route 22 West, Branchburg, New Jersey 08876 USA

ISO 9001:2000

Shipped from: 80 Industrial Drive, Alpha, NJ 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER: Air Pollution Testing
SGI ORDER # : 0138195
ITEM# : 10
P.O.# : D0OFC

CYLINDER # : CC-131241
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 350

CERTIFICATION DATE: 11/6/2008
EXPIRATION DATE: 11/6/2011

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Propane	11/6/2008	50.1 ppm	50.1 ppm	+/- 1%

BALANCE Nitrogen
PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Propane	GMIS-1	CC-113884	100.4 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Propane	H. Packard 6890	US00001434	GC - FID	11/6/2008

THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: _____ DATE: 11/6/2008

FRED PIKULA

Tel: +1 908-252-9300 Fax: +1 908-252-0811
www.spectragases.com

Spectra Gases Inc.

3434 Route 22 West, Branchburg, New Jersey 08876 USA

ISO 9001:2000

Shipped from: 80 Industrial Drive, Alpha, NJ 08865

CERTIFICATE OF ANALYSIS

EPA PROTOCOL MIXTURE

PROCEDURE # : G1

CUSTOMER: Air Pollution Testing
SGI ORDER # : 0138195
ITEM# : 11
P.O.# : D0OFC

CYLINDER # : CC-109853
CYLINDER PRES: 2000 PSIG
CGA OUTLET: 350

CERTIFICATION DATE: 11/10/2008
EXPIRATION DATE: 11/10/2011

CERTIFICATION HISTORY

COMPONENT	DATE OF ASSAY	MEAN CONCENTRATION	CERTIFIED CONCENTRATION	ANALYTICAL ACCURACY
Propane	11/10/2008	84.5 ppm	84.5 ppm	+/- 1%

BALANCE Nitrogen
PREVIOUS CERTIFICATION DATES: None

REFERENCE STANDARDS

COMPONENT	SRM/NTRM#	CYLINDER#	CONCENTRATION
Propane	GMIS-1	CC-113884	100.4 ppm

INSTRUMENTATION

COMPONENT	MAKE/MODEL	SERIAL #	DETECTOR	CALIBRATION DATE(S)
Propane	H. Packard 6890	US00001434	GC - FID	11/6/2008

THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: _____ DATE: 11/10/2008

FRED PIKULA

Tel: +1 908-252-9300 Fax: +1 908-252-0811
www.spectragases.com

500 WEAVER PARK RD, LONGMONT, CO 80501 Phone: 888-253-1635 Fax: 303-772-7673

RATA CLASS

Dual-Analyzed Calibration Standard

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory
AIR LIQUIDE AMERICA SPECIALTY GASES LLC
500 WEAVER PARK RD
LONGMONT, CO 80501

P.O. No.: D0OFC
Project No.: 08-87900-006

Customer
AIR POLLUTION TESTING INC

5530 MARSHALL STREET
ARVADA CO 80002

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards: Procedure G-1; September, 1997.

Cylinder Number: ALM023575 **Certification Date:** 30Apr2010 **Exp. Date:** 29Apr2013
Cylinder Pressure*:** 2000 PSIG

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
PROPANE	303 PPM	+/- 1%	Direct NIST and VSL
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1669	02Dec2010	ALM020021	497.0 PPM	PROPANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HP/6890/US00034440	13Apr2010	TCD/FID

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

First Triad Analysis
PROPANE
Date: 30Apr2010 Response Unit: AREA
Z1=0.00000 R1=2169616. T1=1323570.
R2=2161548. Z2=0.00000 T2=1320192.
Z3=0.00000 T3=1318637. R3=2162688.
Avg. Concentration: 303.0 PPM

Second Triad Analysis

Calibration Curve

Concentration=A+Bx+Cx2+Dx3+Ex4
r=0.999999
Constants: A=-0.63623131
B=0.000227849 C=
D= E=

QUALITY ASSURANCE

APPROVED BY: JOHN ROZOF
(signature on file)

500 WEAVER PARK RD, LONGMONT, CO 80501 Phone: 888-253-1635 Fax: 303-772-7673

RATA CLASS

Dual-Analyzed Calibration Standard

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory
AIR LIQUIDE AMERICA SPECIALTY GASES LLC
500 WEAVER PARK RD
LONGMONT, CO 80501

P.O. No.: D0OFC
Project No.: 08-91494-003

Customer
AIR POLLUTION TESTING INC
5530 MARSHALL STREET
ARVADA CO 80002

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: ALM021204
Cylinder Pressure***: 2000 PSIG
Certification Date: 03Aug2010
Exp. Date: 02Aug2013
Batch No: LGM0002918

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
PROPANE	493 PPM	+/- 1%	Direct NIST and VSL
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997.

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1669	02Dec2010	ALM020021	497.0 PPM	PROPANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HP/6890/US00034440	14Jul2010	TCD/FID

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

First Triad Analysis
PROPANE
Date: 03Aug2010 Response Unit: AREA
Z1=0.00000 R1=2219022. T1=2202857.
R2=2221170. Z2=0.00000 T2=2205384.
Z3=0.00000 T3=2205543. R3=2223349.
Avg. Concentration: 493.3 PPM

Second Triad Analysis

Calibration Curve
Concentration=A+Bx+Cx2+Dx3+Ex4
r=0.999999
Constants: A=0.13534477
B=0.000224442 C=
D= E=

QUALITY ASSURANCE

APPROVED BY: JOHN ROZOF
(signature on file)

500 WEAVER PARK RD, LONGMONT, CO 80501 Phone: 888-253-1635 Fax: 303-772-7673

RATA CLASS

Dual-Analyzed Calibration Standard

CERTIFICATE OF ACCURACY: EPA Protocol Gas

Assay Laboratory
AIR LIQUIDE AMERICA SPECIALTY GASES LLC
500 WEAVER PARK RD
LONGMONT, CO 80501

P.O. No.: D0OFC
Project No.: 08-91010-005

Customer
AIR POLLUTION TESTING INC

5530 MARSHALL STREET
ARVADA CO 80002

ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure G-1; September, 1997.

Cylinder Number: CC279553
Cylinder Pressure***: 2000 PSIG

Certification Date: 27Jul2010

Exp. Date: 26Jul2013
Batch No: LGM0001368

COMPONENT	CERTIFIED CONCENTRATION (Moles)	ACCURACY**	TRACEABILITY
PROPANE	847 PPM	+/- 1%	Direct NIST and VSL
NITROGEN	BALANCE		

*** Do not use when cylinder pressure is below 150 psig.
** Analytical accuracy is based on the requirements of EPA Protocol Procedure G1, September 1997

REFERENCE STANDARD

TYPE/SRM NO.	EXPIRATION DATE	CYLINDER NUMBER	CONCENTRATION	COMPONENT
NTRM 1669	02Dec2010	ALM020021	497.0 PPM	PROPANE

INSTRUMENTATION

INSTRUMENT/MODEL/SERIAL#	DATE LAST CALIBRATED	ANALYTICAL PRINCIPLE
HP/6890/US00034440	14Jul2010	TCD/FID

ANALYZER READINGS

(Z=Zero Gas R=Reference Gas T=Test Gas r=Correlation Coefficient)

First Triad Analysis
PROPANE
Date: 27Jul2010 Response Unit: AREA
Z1=0.00000 R1=2224731. T1=3835200.
R2=2224839. Z2=0.00000 T2=3833325.
Z3=0.00000 T3=3831399. R3=2222815.
Avg. Concentration: 846.5 PPM

Second Triad Analysis

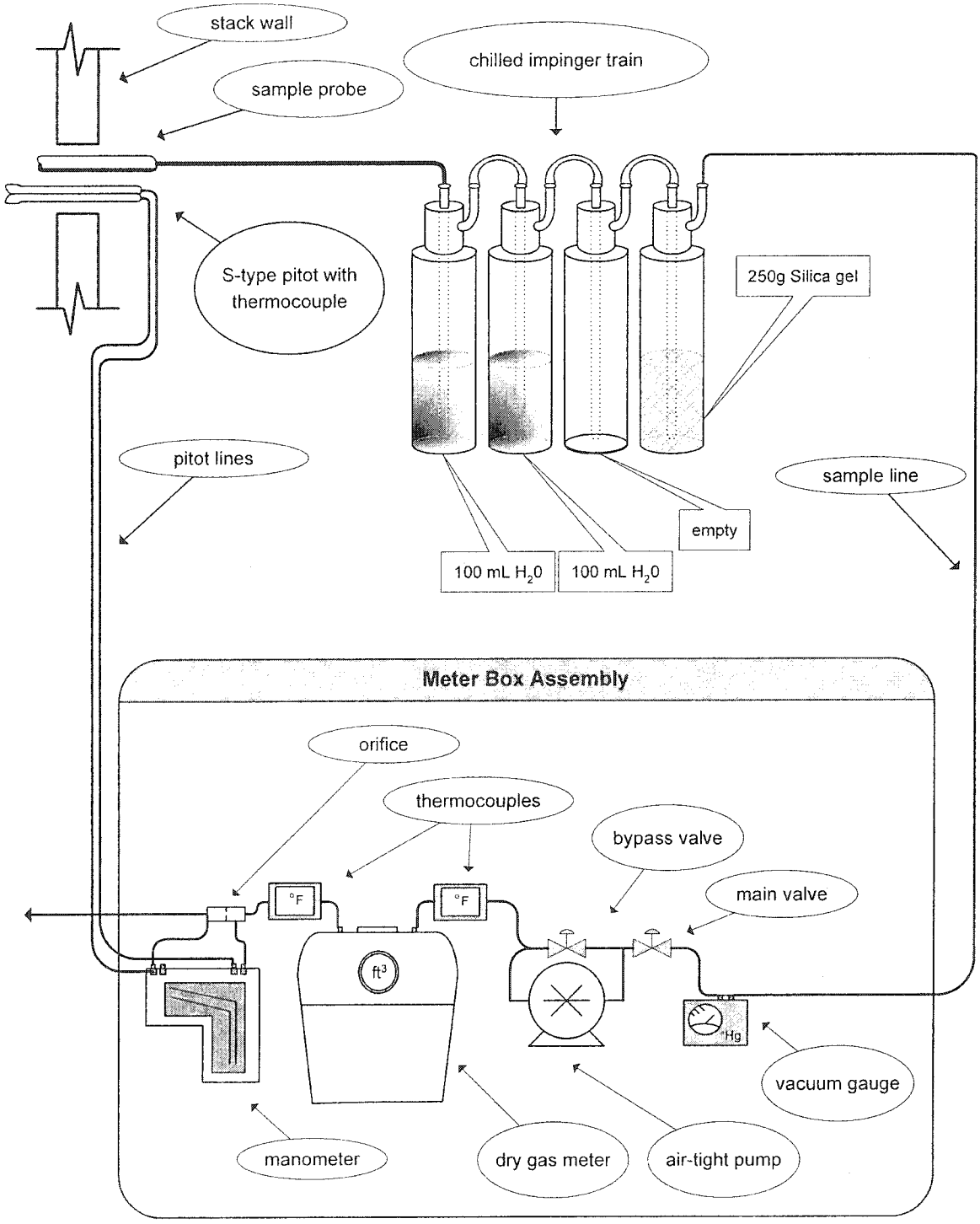
Calibration Curve
Concentration=A+Bx+Cx2+Dx3+Ex4
r=0.999999
Constants: A=0.13534477
B=0.000224442 C=
D= E=

QUALITY ASSURANCE

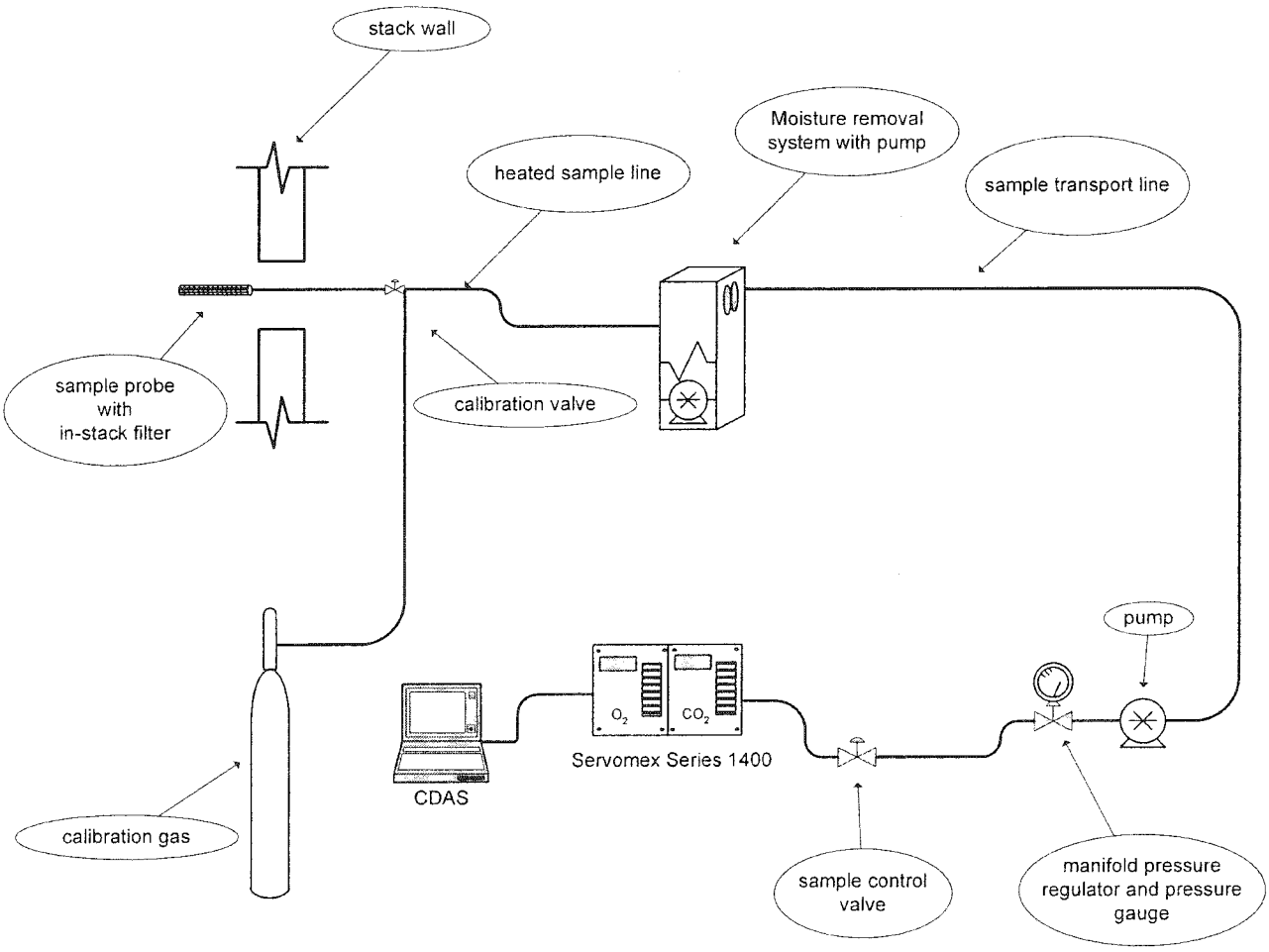
APPROVED BY: ADAM HANLEY
(signature on file)

Appendix 4

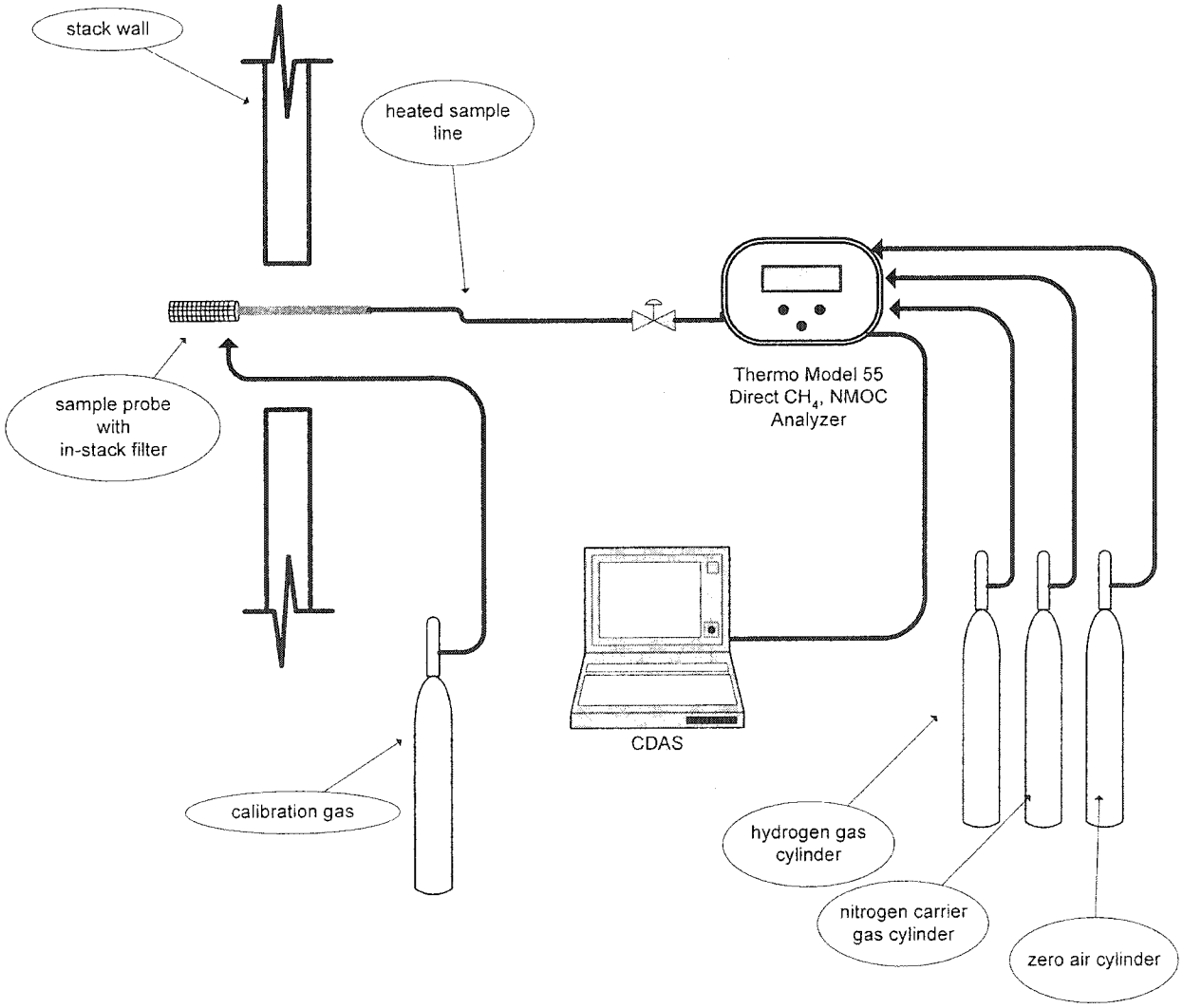
Schematics



EPA Methods 1,2, & 4
sampling train schematic



EPA Method 3A
sampling train schematic



EPA Method 25A
sampling train schematic